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ABSTRACT

This report describes the vision of the Information Systems Advisory Committee (ISAC) of an Information Systems Model for the 1990s. It includes an evaluation of the present automation environment at the university, a vision of library automation at the University of Saskatchewan between 1994 and 1999, and specific recommendations on such issues as the future development of in-house systems, the integration of print and electronic media, training, in-house databases, and the cost-effectiveness of automation endeavors. The report is divided into six major sections. Sections 1 and 2 highlight the creation and role of ISAC and present an analysis of the university libraries' organizational values and philosophy. Section 3 provides the committee's analysis of the current environment at the university and the university libraries, including staffing, collection formats, access issues, records management, acquisitions, and funding. Section 4 addresses the issues and problems arising from this analysis and sets out a suggested "geography" of the structure of systems support that will be necessary to successfully implement this plan. Thirty-nine recommendations are given which anticipate changes that will have an impact on libraries in the next 5 to 10 years. These environmental changes are described in Section 5 and a 5-year plan is outlined. Section 6 presents a "reality scan" which identifies campus-wide, provincial, regional, and international factors and events that could either enhance or impede the pace at which all of the recommendations can be implemented. Concluding the report are six appendixes that contain a formal record of ISAC's work and membership, the program for the ISAC Technology Scan, the ISAC Staff Survey Sub-Committee's executive summary and major recommendations, a description of an information literacy laboratory, and a 62-item bibliography. (MAB)

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INFORMATION SYSTEMS IN THE UNIVERSITY OF SASKATCHEWAN LIBRARIES: A VISION FOR THE 1990s

INFORMATION SYSTEMS ADVISORY COMMITTEE
UNIVERSITY OF SASKATCHEWAN LIBRARIES

IR053773

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May 27, 1991

Paul Wiens
Director of Libraries
University of Saskatchewan

Dear Mr. Wiens:

We, the members of the Information Systems Advisory Committee, have the pleasure of submitting our report on Information Systems in the University of Saskatchewan Libraries: A Vision for the 1990s.

At this time we would also like to acknowledge and thank the following individuals for their help in the completion of the report: Rose Rode, Library Administration, for her work in typing and assisting with the design of the report; Terry Roebuck, Computing Services, Bruno Konecsni, Personnel, and Victor Wiebe and Anne Marie Moulin of the Libraries for their work in the Technology Scan and Peter Pridmore for proof-reading the draft report. Finally, we would like to thank all of the library staff for their participation in the committee's activities such as the staff survey, the technology scan and the system audit.

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EXECUTIVE SUMMARY

This report describes the vision of the Information Systems Advisory Committee of an Information Systems Model for the 1990s. Recommendations contained in Section 4 of the Report address issues and problems arising from the Committee's analysis of values, philosophy and the current situation found in Sections 2 and 3. The recommendations also anticipate changes which will have an impact on libraries in the next five to ten years. These environmental changes are described in Section 5.1. It is expected that the recommendations will pave the way for a smooth transition and adaptation to the anticipated changes. The report also sets out a suggested 'geography' of the structure of systems support which will be necessary to successfully implement this plan (Section 4.9.2).

Major Themes of Recommendations: Consolidation and Preparation

The essential elements of the recommendations are:

- replacement of the Geac 8000 system as soon as possible
- expansion of the range of electronic information services for on and off campus users while developing a single-system image
- major commitment to training in information technology for library staff and users
- major commitment to exploring all avenues for cooperative/ collaborative efforts in the area of information technology and scholarly information, including campus groups (such as Computing Services) as well as provincial, regional, national and international bodies.
- major commitment to microcomputer workstations as tools for personal productivity and as support for user services
- major commitment to standardizing and increasing management information

It is possible to group the recommendations into two broad themes:

Consolidating and Focussing Current Activities

- Replace Geac
  Recommendations 1, 2, 4, 5, 6
- Complete the Evolution of the Super-Catalogue
  Recommendations 3, 7, 16, 17, 18, 25
- Integration of Print and Electronic Formats
  Recommendations 3, 22, 23, 24, 26, 27, 28, 30, 31
- Office Automation and Management Information
  Recommendations 8, 9, 10, 11, 12, 13, 14, 15, 21, 23, 28, 29, 35, 36

- Access to Services
  Recommendations 26, 29, 36

- Staff Training and Development
  Recommendations 12, 32, 33, 34, 36

- Information Systems Planning and Support
  Recommendations 37, 38, 39

Preparing for the Second Half of the 1990s

- Library-Wide Information System/Single-System Image
  Recommendation 3

- Information Literacy
  Recommendations 19, 20, 21

- Access vs. Ownership
  Recommendations 24, 25, 26, 27, 31

- Enriched Databases
  Recommendations 16, 17

- Campus Information Policy
  Recommendation 22

The major challenges to the University and the Libraries will be to determine the priority of each task and the most effective order of scheduling. Securing appropriate funding and other forms of support will be crucial for the successful implementation of the vision.

Recommendations

It is recommended:

1. That the Libraries completely replace the Geac 8000 system in order to modernize the system, increase capacity and reduce operating costs. p. 28

2. That the search process for a replacement for the Geac 8000 system be preceded by a clear articulation of needs. The functionality of a new system should be determined by as close a match as can be achieved in a cost-effective manner between these needs and the technology available in the marketplace. p. 31

3. That the future system achieve a seamless functional integration of the primary catalogue or catalogues, local and remote databases, and external networks. Users will be presented with a single system image, similar to INFOACCESS. p. 32

4. That the selection of the new system be strongly influenced by the provision of service on location by the system vendor or vendors. Fault-tolerant hardware will also be an important consideration in making a selection for a future system. p. 32

5. That the selection of the new system take note of the strong presence of Digital-based systems on campus. p. 32

6. That the methodology of seeking a new system focus on obtaining referrals from vendors to sites which are similar to this library. Systems can then be viewed in actual operation in order to determine which ones meet the Libraries' needs. p. 32

7. That the Libraries, in concert with the University's Computing Services, continue to operate a library network premised on servers either owned, or controlled, by the Libraries. p. 33

8. That a minimum standard for networked applications be identified for use by every library staff member. These might include MAIL, BULLETIN, NOTES, word processing, and access to laser quality printing. p. 33

9. That staff as appropriate have access to standard library management databases, on and off-campus communications gateways, and groupware applications such as scheduling and meeting planners. p. 33

10. That the locus for processing be the staff member's desktop. Wherever necessary, shared networking of software applications should be considered to facilitate workflow on a single data or resource set. p. 33

11. That where appropriate, local area networks within departments be used to maximize effective and efficient use of information technology provided such networks are compatible with the major campus-wide or library-wide networks. p. 33

12. That sufficient training be provided to ensure that all staff members can utilize the automation resources available. p. 33

13. That the Libraries identify critical management information to be made accessible on the network. All library staff should have read-only and download access to as many of these files as reasonable. Selected library staff should be able to enter, update and correct data in specific files from their local workstations. These files must be managed using common application programs supported by the Libraries and/or by Computing Services with formal training and documentation. p. 34

14. That the Libraries formally review and select the application packages to be used to support the Libraries' management information databases. Appropriate weight should be given to Standard Query Language (SQL) links and data import/export functionality. The object is to make it as easy as possible for library staff to upload locally collected data, to download information from central files and to customize reports and presentations locally. p. 34

15. That all library-critical applications be properly documented and properly managed for back-up, archiving and security of data. p. 34

16. That a committee of librarians be created to investigate policies and procedures for content-enrichment and enhanced subject access to appropriate sections of the Libraries' collections. p. 35

17. That the feasibility of indicating local holdings of serials records in all relevant databases be investigated. p. 35

18. That selection criteria for electronic databases include guidelines to aid in the choice of delivery mechanism; in particular, the criteria should give clear guidance as to which are best supported on INFOACCESS or networked servers and which on individual workstations. p. 36

19. That education programs include the teaching of judgement skills in making appropriate, informed choices of resources and tools as well as the mechanical skills of searching and computer access. p. 36

20. That service and educational programs be established which provide strong coordination for the seemingly divergent activities related to informational database searching (online searching, end-user searching and searching of locally owned database services such as the online catalogue, INFOACCESS and CD-ROM). p. 36

21. That a computer-based training facility be established in and managed by the Libraries. This facility would serve as an instructional or teaching laboratory in the use of informational database services. p. 36

22. That the Libraries head a standing University committee to handle policy issues regarding electronically stored data files and software, and that the Libraries coordinate the central listing of accessible databases and software for the campus. p. 38

23. That, in cooperation with the Office of Space Administration, the Libraries develop new formulae of entitlement for study and service space which make reasonable provision for new formats and for workstations or other equipment needed for use of the materials. p. 38

24. That library staff embark on a program of collection policies revision which takes into account choices of format, access costs, user-access issues, need for library intermediary, and ownership. p. 38

25. That the proposed Database Users Group begin the process of collection policies revision by addressing the issues related to reference (service) databases. p. 38

26. That the Libraries adopt a policy of equity of access to all available services for the University community. p. 39

27. That the Libraries develop policies and procedures to identify appropriate use of the Internet in conjunction with traditional and existing services such as interlibrary loans, reference and collection development. p. 39

28. That the Libraries develop, for both staff and users, a training program for use of the Internet and the resources to which it provides access. p. 39

29. That an advocate routinely screen current and proposed information systems to ensure that they are conveniently usable by the disabled and that access is possible with appropriate ease and independence. p. 40

30. That a specific allocation be established within the acquisitions budget for reference database subscriptions and that an appropriate proportion of the acquisitions budget be set for this purpose. p. 40

31. That the Libraries define in a wide and generous manner a set of core services for which no charges will be assessed. For other services, the Libraries should calculate the full cost of providing these services and then decide whether to charge a fee which will cover the partial or full amount of the direct and/or indirect costs. p. 42

32. That the Libraries bring pressure to bear on the profession at large to train library science students in innovative information technologies. p. 42

33. That in the Libraries' hiring practices preference be given to candidates with experience in automated library services. p. 42

34. That a staff development and training officer be appointed to coordinate and enhance training and development opportunities for library staff. p. 43

35. That additional staff positions be created to meet the increased demand for microcomputer-based services and in-house technical support. p. 43

36. That the Libraries ensure that proper attention and budgetary support is given to ergonomic factors. p. 43

37. That there be a standing Information Systems Advisory Committee. p. 44

38. That changes to the mandate of library units and committees be made to create a clear "geography" or division of responsibility for support of library systems. p. 45

39. That the Library Management Advisory Committee review annually the short-term objectives and long-term goals of the Libraries with due consideration given to the recommendations and proposed strategies of this Report and of subsequent reports from the proposed standing Information Systems Advisory Committee in setting and prioritizing objectives. p. 48

1. INTRODUCTION

By 1988 the Libraries had become very dependent upon automation to conduct most day-to-day operations. Automation was seen as "good" but there was uncertainty about the direction it should take. For example, there were concerns about microcomputers versus main-frame based applications; integrated versus distributed systems; and commercial online databases versus CD-ROM or locally-mounted tape reference databases. Concern also focused on the perceived lack of consultation when administrative decisions were being made for implementing automation projects.

In June 1988 it was decided to create an ad hoc committee on future information services as well as an advisory committee for information systems. On August 23, 1988, terms of reference were struck for an Information Systems Advisory Committee (ISAC) (see Appendix 1). The Committee consisted of ten librarians representing all sectors of the library.

The role of ISAC was seen as being:

- to recommend a general policy framework and overall direction for the development and implementation of electronic information systems in the context of the library's current and future information systems;
- to review all proposals which involve electronic information systems planning, development and implementation and to make recommendations on relative priorities;
- to provide a forum for library staff to influence the direction and formulation of policy; and
- to report to the Director of Libraries through Management Team.[1]

After consultation with the Director of Libraries, it was determined that the committee focus its attention on two main areas:

1. To review and make recommendations regarding current systems applications and implementations.
2. To make recommendations regarding the direction of the Libraries' automation over the next five to ten years.

The end result would be a report which would include: an evaluation of the automation environment at the time of the report's submission; a vision of library automation at the University of Saskatchewan between 1994 and 1999; and specific recommendations on issues such as future development of in-house systems, the integration of print and electronic media, training, in-house databases, and cost-effectiveness of automation endeavors.

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[1] Recently renamed the Library Management Advisory Committee.

The Committee found no lack of exhortatory statements or lists of questions in the relevant literature but remarkably little concrete guidance or experience as it attempted to chart a course for the next decade. One of the more focussed statements of the challenges in this area was contained in a recent publication of the Council on Library Resources. The Council, a major sponsor of research and demonstration programs in the area of long range planning for research libraries, stated that:

> . . . the present and prospective influence of computerized text storage and telecommunications on libraries and scholarship is acknowledged, but there is no agreement on how far technology might, or should, go in transforming print-based libraries. Simply put, the question is "will libraries, perhaps in the next twenty years or so, be largely transformed into linked, fully computerized information services or will technology-based information resources be essentially additive, available through libraries and elsewhere?" There are strong opinions supporting (and opposing) each of these prospects but there are no clear answers.
>
> . . . these opinions can be roughly grouped into three camps. One asserts that maintenance of established research capabilities requires unwavering pursuit of the goal of comprehensive – and, thus, ever-expanding – print collections. Others, often reflecting financial concerns, conclude that the era of consistent growth is at an end and see in the future greater diversity among research libraries, with few committed to maintaining broadly-based collections of record and many others relying on technology-based resource systems and a fully developed structure of interdependencies. Still others project a future in which suitability of format (print or electronic) would be measured against pertinent factors – nature of use, level of demand, costs, permanence and so on. In essence, print and electronic records would live side by side and both capabilities would be maintained, each to be used as appropriate. . . .
>
> For every prospect, the same elements are present in the equation that expresses the dilemma – cost, availability, accessibility and, for each individual user, convenience and utility. The values put on each variable will shape the library at each institution and it is probable that the results will be obtained as much through political as through analytical processes. Increasingly cost containment will play a decisive role. . . . The responsibility for shaping library resources and services rests with librarians. This does not mean that institutional information policies are to be imposed by

> librarians. It does mean that librarians must pose the key policy questions; must assure that those questions are carefully considered by all who are affected and that policies are set; and, finally, must see to it that policies are fully articulated, understood and followed.[2]

The Committee undertook the following activities which have culminated in this report:

- February 1989
  Evaluation of the existing automation environment including the collection, staff, the major automated system (GEAC), related information systems (SKLIB/INFOACCESS), in-house microcomputer-based applications, clientele, and the external operating environment.

- May 1989
  In-depth study of users' preference of format for specific index services - that is, print-based or locally mounted magnetic tape or on-site CD-ROM.

- September 1989
  In-depth audit of the GEAC system.

- February 6-22, 1990
  A technology scan involving fourteen presentations, each focusing on a particular area of automation which affects or might affect the university libraries.

- April 1990
  The Library Staff Survey Report (attached as Appendix 3) in which staff itemized needs and requirements for existing or continued library automation.

- December 1990
  ISAC Editorial Committee constituted and begins meeting.

In addition, the Committee considered several specific issues which were referred to it. These included remote and third-party access, replacement of the multiplexer, selection of additional databases for INFOACCESS and CD-ROM and allocation of ethernet connections.

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[2] "A Review of the CLR Research Program, 1986-1990" in Council on Library Resources Program Reports. (Washington, D.C.: Council on Library Resources, December, 1990) 21-23.

2. ORGANIZATIONAL VALUES AND PHILOSOPHY

The values of the University of Saskatchewan Libraries are implicit in their Mission Statement, their Goals and Objectives and in their report to the President's Committee on Renewal (October 1990). The Libraries describe themselves in the latter report as:

> . . . an organic combination of people, collections and buildings whose purpose is to assist users in the process of transforming information into knowledge. . . . The quality of the University's research and teaching programs, and the quality of the faculty's contributions to the academic enterprise are inextricably linked to the quality of the information services provided by the Libraries in support of the university's programs. . . . [The values espoused by the Libraries are also] inextricably linked to the quality of information services provided . . .[3]

With a strong commitment to stated values, the Libraries then have a foundation and perspective to evaluate their role and to plan for their services.

2.1 Freedom of Inquiry

The Libraries' purpose is "to provide information resources and services to the students and faculty of the University ..."[4] Therefore the Libraries value:

a) freedom of inquiry by all users;
b) critical and investigative thinking;
c) unrestricted access to the collections and services of the Libraries; and
d) the right of patrons to confidentiality.

2.2 Information Literacy

The second part of the Mission Statement describes the ultimate activity of the Libraries: "to educate this community in the use of information resources." Therefore the Libraries value:

e) information literacy: it is not enough to simply provide the raw material of information; the Libraries must also provide evaluative and interpretative services so that users will come in with information needs and leave not only with these needs met but also with knowledge of how information resources are organized and accessed; and

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[3] University of Saskatchewan Libraries Response to the President's Committee on Renewal Information Request, (September, 1990) p. 2

[4] University of Saskatchewan Libraries Mission Statement, (September 1990)

f) competent, trained and educated staff having a breadth of knowledge and experience, who can empathize with and respond to the myriad of users' needs.

2.3 Service Motivation

Goals 1, 2 and 7 of the Mission Statement deal with the provision of high quality service in various activities. Therefore the Libraries value:

g) a staff whose motivation is service-based;
h) continuing training and development opportunities for staff; and
i) innovation and flexibility in planning and decision-making.

2.4 Efficient Delivery of Service and Information

The Libraries' goals acknowledge that information and services must be current and efficiently provided. Therefore the Libraries value:

j) use of current technology to improve and enhance information, research and orientation services, and to improve communication of information among library staff; and
k) the standardization of hardware and software for applications common throughout the library system to create a pool of expertise so that staff can build on each other's knowledge and operate effectively in a variety of situations.

2.5 Collections and Access

Goals 4, 5 and 6 of the Libraries Mission Statement delineate the Library's "collection activities" in the broadest sense. The Libraries have a responsibility to provide the physical collection which houses information in a multitude of formats. The Libraries also recognize a responsibility to provide access to this collection. While it is physically and financially impossible for any library to provide the entire universe of information, a balance between the "information gateway" and the collection function must be struck. Therefore the Libraries value:

l) ownership and preservation of a collection in all formats which meets the fundamental teaching and research needs of the University of Saskatchewan;
m) continual evaluation and examination of the curriculum and the publishing universe (in all formats) to build this collection;
n) staff with the appropriate level of subject expertise and training to ensure a responsive and coordinated collection;
o) a depth of access to the collection, assisted by knowledgeable staff and appropriate technology, which serves the needs of the user; and
p) cooperation with other organizations to provide users with a gateway to resources which are not available on site.

2.6 Space and Environment

The Libraries also have a responsibility to provide an appropriate physical setting for both its users and its staff, as set out in Goal 8 of the Mission Statement. A research library is the fundamental laboratory of the mind, where information is synthesized into knowledge. Therefore the Libraries value:

q) a physical space large enough to accommodate their users, services, staff and collections;
r) comfortable, safe and efficient organization of this space; and
s) flexibility of space with regard to accommodation of new technologies and services.

3. ENVIRONMENTAL ANALYSIS

In looking to plan strategic directions for automated systems development, there is a need to know two things: (a) the current situation and its history; and (b) some of the options that might thereby be available in the future. To discover and clarify these the following analysis of the environment is presented.

3.1 University

By 1985 the University had adopted a style of computing known as network-based computing after progressing through earlier stages of batch processing, timesharing, and distributed computing. Some applications based on these earlier stages still exist. However, it is important to note that this campus has never been in the position of using a monolithic mainframe system to support all major teaching, research and administration applications.

In network-based computing, personal computers and workstations are connected by a local network to college, departmental or work-group servers, to a campus network and ultimately to external networks. The advantages of this computing style include: provision of a convenient, easy to use and consistent communication medium; greater sharing of data and other resources; transparency of access; and lower costs of expansion and upgrades.

A new computing style, which might be best called "information-based computing" is emerging in the 1990s. Here there is a shift in emphasis from central facilities to the user's desktop applications. Powerful workstations will have easier interfaces and will be a window to network-based information and computation resources.

The provincial and campus economic outlook is not bright. Two reviews have recently been completed which evaluated all campus departments and services in order to develop a basis for strategic planning and long-term budgeting. The future success of the University of Saskatchewan and its Libraries is dependent on continued investment and growth in information technology. Any significant reduction of this investment will affect the Libraries' ability to maintain their existing services and capacity for growth.

3.2 Libraries

Since 1984 the University of Saskatchewan Libraries have been engaged in a comprehensive program of automated information systems development. In doing this, the Libraries have mirrored the level of activity in systems development across the campus.

The University of Saskatchewan Libraries have attempted to exploit new technology and local and remote network resources to achieve their goals and objectives. The general philosophy has been to view the Libraries as a resource "without walls." This concept has been reinforced by the strong trend in the Province of Saskatchewan towards off-campus/satellite education. Workstations by necessity have become the "windows to the libraries." The Libraries have further responded with the provision of free dial-up access to their bibliographic databases. To cope with these developments they have also had to review the focus of their orientation and instruction programs.

It is probable that research libraries will soon be measured on the quality of access to information as well as on traditional measures such as document delivery and collection size. More dramatically, the Libraries may experience a shift in user demand towards emphasizing provision of information rather than storage/maintenance of physical items. Core collections (whatever the format) will still be needed to support the major teaching and research mission of the University.

Further development of local support capabilities to permit external and internal electronic communication is acutely necessary. The Libraries are now heavily dependent on electronic communications for such applications as interlibrary loans and resource sharing; administrative communications; cataloguing using bibliographic networks; interactive searching of remote databases; and information transmittal for off-campus services. Soon, acquisitions by direct computer-to-computer ordering and other forms of Electronic Data Interchange (EDI) on and off campus will be incorporated into daily operations.

3.3 Library Staff

Libraries are service organizations and as such are labour intensive. Behind-the-scenes activities supporting service functions are also labour intensive and require highly trained staff. The library budget reflects this situation, with over sixty percent allocated to staff salaries. The Libraries are dependent on their personnel to provide quality and timely service at the level appropriate for each user. Staff development and in-house training are therefore essential components of automation considerations.

Change is a constant, visible and hard-to-deal-with entity. Staff have to be trained to understand and handle the challenge of change. Indeed, the ability of the organization to change and grow depends on the quality of the staff. The Libraries must create an environment where staff can continue to develop. Careful attention must be paid to their needs.

In 1990/91 the library system employed 179.1142 FTE employees, including 138.1142 CUPE support staff, 3 ASPA staff and 38 librarians. There is a now considerable body of expertise with regard to computer literacy. The establishment and maintenance of a trained and competent staff requires time and effort and an adequate budget.

3.4 Users

The primary users of the library system are the 18,000 students enrolled in more than 2,000 courses[5] and the faculty who teach them. As the province's major university, the University of Saskatchewan has a fully developed College of Arts and Science, providing a full array of courses from Fine Arts, Humanities, the Social Sciences and the Basic Sciences. There are also twelve professional colleges ranging from Agriculture to Veterinary Medicine. In fact, the professional colleges comprise more than half the University. They have 70% of the departments, 65% of the faculty members, 56% of the full-time undergraduates, 65% of the graduate students, 69% of the graduate courses, and 78% of the research dollars. The College of Arts and Science is larger in two areas. It has 51% of the undergraduate courses and 58% of the part-time students.

This concentration of professional colleges on one campus, in combination with a full array of Arts and Science courses, creates a demand for widely diverse literatures to support teaching and research in all these areas. Although there is some overlap and mutual support (for example, journals in the Biological Sciences support research in Medicine and Veterinary Medicine), in general the Libraries' resources are very tightly stretched to support these diverse programs.

Another area of growing activity is the provision of courses around the province. Some 254 credit unit equivalents are given in as many as 12 locations each year. The Provincial government has given increasing emphasis to distance education over the past few years and this emphasis will probably increase in the future.

In 1990 the Information Systems Advisory Committee polled all librarians with public services and collection development responsibilities to gain some idea of how the needs of the users might change in the next five to ten years.

Those librarians who responded predicted that most faculty would continue to use the library system in much the same way as they always have. Faculty in the humanities would want the monograph budget protected, not be diverted to other formats or services. Other faculty, particularly the sciences and the professional colleges, would want the serials protected. Several librarians said that users would take advantage of any innovations, (for example, the introduction of CD-ROM microcomputer-based indexes) particularly if the service/format were introduced at no, or low, cost.

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[5] The data are obtained from University of Saskatchewan Statistics, volume XVI December, 1990, issued by the University Studies Group. A summary of the counts used to generate these comparisons is given in Appendix 4.

From these comments, it would seem that the far-reaching and fundamental changes predicted by experts in academic computing are not yet greatly changing the outlooks and working habits of the majority of the faculty at the University. That change may yet come, and may be more visible when both users and librarians have had greater experience with innovations in computer-based instruction and research.

Methods of doing research today vary from simple "pencil and paper" to data analysis on very powerful high speed computers located at other institutions. Most people, whether students or researchers, who have learned to use a word processing program have no desire to return to typewriters. The attraction that the CD-ROM versions of indexes have had for students and faculty has been amazing and is in part due to the simple fact that free and convenient printouts of search results are available immediately. Many users now want to be able to access the library catalogues and indexes from home and be able to download library records into their own database or bibliographic programs. Some are asking for the full text to be available online. A few academic departments subscribe to services such as Current Contents on diskette or CD-ROM databases such as Sport Discus (College of Physical Education), PDQ/Cancerlit (the Cancer Clinic) and Isocrates (Department of Classical Studies). This trend will continue and expand in the future, particularly where departments or colleges are willing to absorb the cost.

Still to be faced is the issue of payment for use. Computers can keep track of who accesses what, whereas with printed indexes and journals there has not been any way to estimate or count usage. Publishers, if not copyright legislation, may well demand royalty payments for access to full-text information.

3.5 Collection Formats

The Library collection consists of almost 1.41 million printed volumes, including about 10,000 current subscriptions to journal titles; in addition the Library holds over 2 million items in microform and 394,464 government documents and pamphlets. In 1989/90 the total collection grew by 195,801 items or 5%.

Automation issues which touch on the collection may be characterized as follows:

- access (actual listings of holdings, for example GEAC for the catalogued collection, INFOACCESS databases for government publications, pamphlets in Special Collections, etc., Pro-Cite databases for special material types in Education) and issues related to searching and authority control;

- inclusion of or access to other database records for subsets of the collection, typically microform sets or maps (for example the collection of the Canadian Institute for Historical Microreproduction accessed as a separate database or its records integrated with locally produced cataloguing) and listing of other university resources (for example, affiliated college collections, the a/v film library, slide library, Computing Services' mounted software and databases);
- management of proliferating and duplicate formats and equipment for accessing materials;
- source records at some stage of the selection, ordering or cataloguing process as a means of initiating a local cataloguing record;
- maintenance and reporting of requests and orders in the acquisitions process, including financial reporting;
- item-level control of the collection for inventory (including serials management), binding and circulation as well as reporting to union catalogues such as NLC; and
- collection and reporting of statistics for library operations such as shelf-listing and collection counts and evaluation and bibliographic extracts as a public service.

3.5.1 Access Issues

There are two large issues regarding the catalogued collection: database maintenance coupled with authority control and depth of access.

Given the library's long history of creating machine-readable records, the master database not surprisingly has records which reflect a variety of cataloguing and field tagging norms for which the eye may be forgiving, but the machine is not. Reconciling differences of entry, machine-filing codes, and so on is as much a matter of staffing as of computer resources and affects efficiency of technical throughput as well as service to our users.

Authority control describes a method of global changes for large numbers of records, and of ongoing prevention of variant forms, or at least of referencing to and from preferred headings. The referencing process can be visible to the user (for example, "Samuel Clemens SEE Mark Twain") or can be transparently accomplished by the software.

Depth of access refers currently to keyword and operational boolean searching and will soon encompass applying hypertext strategies to existing databases. The expectations of library clients familiar with index and abstract databases will create increasing pressure for article-level catalogues and for searchable abstracts of books, to say nothing of full-text retrieval.

With a recent thrust in French Immersion programs and outside funding, there may well be pressure for some level of bilingual service including parallel cataloguing and French language access for certain parts of the collection.

3.5.2 Inclusion and Integration of Records

Over half of the local collection's resources are held in a large, under-used microform collection typically requiring three access steps: find the collection listing, consult a separate finding aid and finally locate the text on fiche or film. Records for many of these sets can now be purchased in machine-readable form for loading into local online catalogues. The issues here are database integrity (for instance, duplicate records which have variations in access points), common search interface and the desire to fully exploit and promote the use of these expensive resources.

In a university where the major portion of library traffic involves undergraduate students, there could be a danger in overwhelming users with the sheer volume of holdings. The solution may lie in systematic education of users, so that library clients will know when to go beyond the first step of consulting a general online catalogue. The attitude to fight will be that of users who expect instant and appropriate results with only a single transaction step or who will be reluctant to make informed choices between traditional sources and immediate electronic gratification.

Where there is commercial viability, digitized text which may be directly accessed from its index will become a collecting and servicing format of great significance. Examples of this are the Oxford English Dictionary on CD-ROM or texts preserved together with their indexing on optical discs. There is an imposing volume of electronic texts available from various not-for-profit organizations as well. These texts vary considerably in structure and editorial integrity and present a challenge to traditional research library practices.

The Libraries have the technical capacity to act as a broker for many other campus information resources such as the library collections of the federated and affiliated colleges, the slide library, and the film library. The question is what priority should be given to this role. What policies and procedures are necessary in such an endeavour?

3.5.3 Proliferating and Duplicate Collection Formats

The inconvenience and the danger of losing or corrupting information recorded in magnetic form has determined a conservative library approach to collections. To date no unique paper copies of indexes have been cancelled in favour of magnetic or optical formats. For some types of information the high storage capacity, convenience of use and the reluctance of users to struggle with the print version will join with environmental issues to move towards increasing portions of the collection to electronic format. Policy must try to anticipate such issues as need for workstations, multiple access, training for users and contingency planning for down-time periods. Funding will be of particular concern in that the electronic format itself is expensive to acquire (in spite of an advantageous production cost per kilobyte of information) and requires considerable investment in equipment and in educational service programming.

Equipment must give appropriate access to a variety of formats and multimedia (sound, motion, colour) and allow patrons to capture, massage and print, save or download portions of data. The latter may require provision for logging transactions and paying copyright or user fees.

Ongoing education of users will be necessary not only to teach the mechanics of access to information, but also the essential skills in choosing appropriate information tools.

"Snapshot" preservation of electronic texts and databases which are continually updated will surely become an issue for historians and publishers and some libraries or archives will no doubt be called upon to maintain such collections. Similarly the question of renewing or transporting information to accessible formats will be an ongoing issue because of the rapid obsolescence of hardware, for example, new floppy disk standards which seem to change on a cycle of 5 to 8 years.

Retrieving information from the collections, manipulating or extracting data and downloading it to usable files for patrons will create pressures for educational programs for both staff and library clientele. Logging use, cost analysis of services and cost recovery will likely be accompanying issues.

Farther in the future, the larger question of access to information as opposed to collecting holdings may become a much more significant issue, but is probably at least a decade away. Selection issues will increasingly involve consideration of such factors as prime service space, workstation requirements, training requirements, potential for multiple access, targeted clientele and cost-effectiveness. The Libraries will have to make decisions respecting budgeting for services supplemental to the collection to pay for information which cannot justify the overhead of local holdings and service.

3.5.4 Source Records For Cataloguing

Records for local holdings may be created locally or may be purchased or derived from other sources and adapted.

Costs tend to escalate when local variations are introduced. The challenge for library staff is to balance the costs of such modifications against the benefits of consistent data or enhanced records.

3.5.5 Acquisitions Processes

Since acquisitions processes involve the control of a potential collection (or records and materials at a pre-collection stage), some of the general automation issues regarding access apply again here, namely reasonable similarity of searching access for prevention of duplicate orders and use of standard records for identification and efficiency.

More specific to the future of these processes are ones of communication between the library and vendors, between the library and the business office (for payment of invoices) and reporting of status of orders, budget analysis, etc.

3.5.6 Inventory Control

Inventory control is one of the major features of automation for libraries. Associating bibliographic entries with physical volumes and physical volumes with locations and with borrowers is essential for basic services. Reporting of holdings to union catalogues such as the Canadian National Union Catalogue will likely remain an issue for at least the next five years, but may become a different issue with the development of Internet searching.

The most immediate need for inventory control is that of automated control of current issues of serials. The extension of serials control to include binding is also desirable.

Communications issues will probably be coupled with inventory control in direct or interactive requests for holds and interlibrary loans.

3.5.7 Statistics

Coupled with every question regarding automation and library collections is the issue of dependable statistics.

If space is going to limit what one can hold in prime service locations, historical circulation records are needed to identify the used and the useful.

The Association of Research Libraries (ARL) now requests counts of both physical units and titles. Physical units are currently derived from manual counts, reported to and consolidated in the Library Administration Office on a spreadsheet. The Libraries cannot presently produce a title count according to format. ARL apparently assumes that most research libraries now have electronic databases from which both a physical and title holdings count can be derived (last year's count, adds, withdrawals, net adds, this year's count). Also requested are the number of current serials and the number of books purchased (for example, volume/title adds which are included in acquisitions expenditure figures).

Finally ARL is asking for the number of records of locally held materials in local online catalogues: currently subsets of the records mounted on InfoAccess (Government Publications and Special Collections).

With financial reports, the identification of "snapshot" points, most crucially at the fiscal year-end, is very important if certain reports are not frozen (for example, isolated from further adjustments such as for varying currency rates) or archived.

Statistics and reports for such things as shelf-listing and collection evaluation (counts and lists) are required for everyday library management. Pressure for a public service component of this type of report – in the form of bibliographic extracts – is growing.

3.6 Current State of Automation at the University of Saskatchewan Libraries

3.6.1 Historical Perspective

The Libraries have a long and distinguished automation history dating back to the 1960s. In 1967 a circulation system based on punched cards was introduced. The automation of technical services commenced in 1969 with MARC file searching and the subsequent production of catalogue cards from MARC records. In 1971, the implementation of TESA-1 (Technical Services Automation: Phase 1) automated ordering and cataloguing functions for monographs. Serials automation was introduced in 1973 with TESA-2. By late 1976, TESA-2 supported serials cataloguing and the production of lists of serial holdings.

In June 1980 the punched card circulation system was replaced by phase 1 of an online system supported by a dedicated minicomputer. However, this system was only operational in the Main and Engineering branches. A review of the state of the Libraries' automated systems late in 1980 concluded that it would not be fruitful to continue with local development of either TESA or the circulation system. Instead, it was recommended that a turnkey online integrated library system be acquired. A Request for Proposal was issued in 1981 and a long and exhaustive search commenced.

In 1984 the Library signed a Purchase Agreement with Geac for its Geac 8000 Library Information System (GLIS). The system was implemented during 1986 and 1987. The system was upgraded to a Dual 8000 configuration in 1988 and additional hardware, both host equipment and terminals, has been added to expand system capacity. However, as described in detail in section 5.1, the functional capacity of the Dual 8000 system has reached its limit.

The Libraries for many years have offered mediated remote bibliographic database searching. During the winter of 1986-87 CD-ROM database searching was introduced in the Health Sciences and Education Libraries. Today there are 20 CD-ROM workstations distributed throughout the library system supporting more than 30 CD-ROM databases. Library staff are currently investigating options for networking these resources.

In 1988 a second computer, a VAX 3600, was purchased to act as a host for a local database searching service named INFOACCESS. The success of the INFOACCESS service has led to its expansion. By the end of 1991 there will be fifteen databases available from the INFOACCESS public menu as well as a gateway to the Geac online catalogue.

The VAX (usually called by its network name, SKLIB) is also used by library staff for electronic mail (both local and remote), word processing, and access to a host of services on the University network.

There has also been tremendous expansion in the area of administrative microcomputing. There are now approximately 40 microcomputer workstations for use by library staff. About half of these are presently attached to the University network. Staff microcomputers are being purchased as rapidly as funding permits in order to implement a program of comprehensive support and connectivity.

3.6.2 The Present Situation

3.6.2.1 The Library Systems Environment

Effective performance of almost all library functions now requires access to either a terminal or a microcomputer at some stage in the process. There have been remarkable advances in computer literacy among library staff in recent years and this has created increased expectations. The experience gained in operating the Geac system over the past four years will be an asset in the selection and implementation of the next system.

3.6.2.2 Geac Dual 8000 System Capacity

CPU

In May 1989 the Geac system finally met the minimum contractual response time standards. It still does not have the capacity to operate either the authorities or the serials control subsystems or to do functional boolean searching.

Disk Space

One of the two cpu's has reached 85% of its maximum disk storage capacity; the other is at 56%.

Hardware and Software Obsolescence

The Libraries' Geac hardware is aging and many of the components are obsolete. The company has also announced that Release 12.5, installed during 1990-1991, will be the last software upgrade for the 8000 system.

Operating Costs

The Library now pays over $160,000 annually in Geac hardware and software maintenance charges. Maintenance charges for Geac hardware are significantly higher than for comparable Digital hardware. Software maintenance charges have increased approximately 30% in 1990.

The Geac 8000 system is highly labour intensive to operate. The Libraries currently assign approximately 4.7 FTE staff to manage it.

Vendor Support

For some time there have been concerns that support from the Geac Library Assistance Desk (LAD) has not consistently met the Libraries' needs. The company has reassigned its most experienced LAD staff to provide support for the 9000 and ADVANCE system, reducing the quality of assistance for 8000 customers. The new electronic mail problem-reporting system has initially increased rather than decreased difficulties in communicating with the LAD.

Geac's Corporate Direction

Although the company recovered from being placed in receivership in 1988, doubts still remain in the library community concerning Geac's long term viability. Marketing of the 9000 system appears to have slowed down in North America, and recently Geac has suspended its work on Open Systems Interconnection (OSI) applications. Key staff continue to leave the company.

Geac hardware is obsolete and would fetch very little on the second hand market. On the other hand, the VAX 3600 can be upgraded for increased performance and the terminals are still industry standard. Given the existing inventory of Digital equipment in the library and the operations and technical support available for Digital hardware on campus, it would make sense for the Libraries to give strong consideration to Digital-based systems in choosing a replacement for Geac.

3.6.2.3 Current Projects, Plans

Because of system limitations and the reluctance to invest a large amount of additional funds in an obsolete system, little further development is taking place with the Geac system. Systems Department staff are concentrating on such relatively minor enhancements as improved reports and interfacing source records. The major thrust in library systems at the moment is towards the expansion of support for local databases, both on magnetic tape and CD-ROM.

3.6.2.4 The Geography of Systems Support

One of the biggest challenges is system fragmentation. Library staff currently use many different and, for the most part, unconnected systems:

Westbridge:	source records, serials inventory
Geac:	acquisitions, cataloguing, circulation, online catalogue
SKLIB:	bibliographic databases, electronic mail, word processing
CD-ROM:	local databases, source record searching
ACUILLA:	interlibrary loan
Administrative microcomputing:	word processing, spreadsheets, database management, and numerous other applications.
SKYBLU:	numeric databases

In addition there are major functions that are not yet automated, particularly serials control and authority control.

The expansion of computing activity is outstripping the capacity of the Systems Department to support it. Increasingly, library staff are having to get help wherever they can find it. The report of the Library Staff Survey conducted by ISAC has recommended that Library management address the question of "the geography of systems support".

3.7 Technology Trends

The use of technology in support of almost every library service is becoming an expected and critical aspect of operations. In the face of wide-ranging demands for specific applications the factors identified below ought to provide some guidance in choosing the most appropriate configurations.

3.7.1 Telecommunications and Networks

The University of Saskatchewan has adopted a network strategy whose objective is to ensure that every desktop on the campus is linked to the network within 5 years. Using this infrastructure, the Libraries will be able to develop an entire range of services which are intended to be delivered over the network using a variety of servers. The speed at which every desk can be wired will depend on funding. There is also the question whether the "network is the system" philosophy will require a parallel library network of distributed servers.

Telecommunications to off-campus sites will also be a standard feature supporting various library services. The implementation of CA*Net and Sask#Net will provide the information highways over which the Libraries communicate with other libraries and remote users for any number of purposes.

3.7.2 Integrated and Distributed Systems

The increasing compatibility of various hardware platforms and operating systems and the increasing power of desktop workstations has made a strategy of distributed systems more and more attractive. A strong local communications network is also a prerequisite to this strategy. The Libraries should be able to mix-and-match various components to achieve an optimum configuration. The integration of these components must be carefully managed so that staff and users are not hindered in their work.

The costs of managing a distributed system are substantial. The trend of computer hardware, software operating systems and functionality all dictate that enormous power will be located on the individual desktop. Any library automation strategy which ignores this trend is doomed to failure. Coordinating this desktop power will be a major management challenge.

3.7.3 Office Automation

Whatever library staff might want to do in the area of office automation is now technically feasible and reasonably affordable. The key decision will be what priority to give this area of automation against the competing demands of support for other critical areas of activity such as database creation and maintenance and document delivery.

3.7.4 Database Creation, Maintenance and Access

As the Libraries offer access to more and more databases, either created locally, purchased and mounted locally on a variety of platforms or offered over the network but mounted remotely, the need for a strong database management system with a powerful but easy-to-use search and retrieval interface will become overwhelming. It will be critical to make the correct choice from amongst the various systems packages.

New techniques for organization and access involving intelligent interfaces, expert systems, hypertext and so on are likely to become increasingly necessary and important.

3.7.5 Document Delivery

As the Libraries' financial resources are increasingly unable to keep pace with the demand for materials, the ability to deliver documents quickly and reasonably cheaply will become critical to the successful performance of this aspect of the Mission. The development of a high-speed network, powerful file transfer facilities, a number of repositories of electronic text, fax servers and so on will be available to support this service. The documents which must be delivered will increasingly be compound documents, which will strain network capacity and hardware functionality.

3.8 Scholarly Communication and Research

3.8.1 The System of Scholarly Communication

> Scholarly Communication, the report of the American Council Learned Societies-sponsored National Enquiry, clearly and forcefully describes scholarly communications as a system of interdependent elements - the interests and work of individual scholars, the disciplines, research libraries, the book and journal publishing communities, and public and private funding sources.[6]

Each of these elements is undergoing profound change. The impact of these changes on the other elements in the system of scholarly communication and on the University of Saskatchewan Libraries must be continually monitored and evaluated. As an example, some persons examining the spiralling cost of scholarly journals in the scientific and technical disciplines have advocated a completely electronic system of exchanging papers over the Internet. This, in turn, raises further concerns about bibliographic control, equitable access, and quality-control (that is, refereeing). It must not be forgotten that "making accessible" does not equal "publishing." The essential point is that each proposed or actual change represents either a threat or an opportunity which must be examined and either opposed or supported.

3.8.2 The Impact of Research Networks

Research networks have a history dating back twenty years. ARPANET and now the Internet have assumed a position of increasing importance in the system of scholarly communication. As Edwin Brownrigg notes,

> . . . the agglutination [sic] of resources within the Internet is truly impressive. The number of computers connected to the network is in the tens of thousands and perhaps in the hundreds of thousands when unknown numbers of personal computers on local area networks are taken in account. The major applications among these devices have been electronic mail and other forms of file sharing. . . . However, what the community now appears to want in growing demand is more library-like services. This demand represents an evolutionary step beyond electronic information provision taking place within libraries today.

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[6] A Statement From the Research Library Committee. (Washington, D.C.; Council on Research Libraries, May, 1990)

> Library-like services are different from traditional library services. Such services reduce to electronics and can emanate remotely from the library. Online catalog and other database access has already begun. So, the challenge for traditional librarians is to readjust further the professional focus from communication primarily by print to communication in significant part by electronics.[7]

In 1988 legislation proposing the creation of a "National Research and Education Network" (NREN) was introduced in the United States Congress. This legislation has generated an enormous amount of interest since it would lead to a major increase in the capacity of researchers to connect to each other and to computerized research tools. Research libraries have taken vigorous steps to become involved in the development and implementation of NREN through such organizations as the American Library Association and the Association of Research Libraries. The Association of Research Libraries has joined with EDUCOM and CAUSE to form the Coalition for Networked Information. Canadian research libraries have become participants in this area with the formation of CA*Net.

Although, understandably, there is a great deal of excitement Concerning the potential impact of research networks on scholarly communication and research libraries, a team of researchers led by Dr. Charles McClure has identified a large element of "technophoria" in the literature and policy analyses of the NREN. The team concluded that, "there is little empirical evidence that describes how scholarly productivity has been or would be improved nationally as a result of such networks or how institutional and individual characteristics impede or encourage the successful use of electronic networks."[8] The study identified such barriers to successful use as: inadequate education and training, lack of technical standards, complex or unknown procedures, insufficient or uneven network capacity, unreliability of data transmission or data transformations, lack of user-based systems and applications, poor documentation, inadequate directories, insufficient connectivity, technological overkill, uncertainties about network management and doubts about data security. The study goes on to identify key issues which will have to be addressed in order to realize the promise of NREN.

Research networks and the library-like services available through the networks will undoubtedly play an increasingly important role in the work of librarians and faculty on this campus. It will be important for librarians to have wide knowledge of what is available and how to get at it, in much the same manner as any other remote database service. It will also be important for librarians to communicate with faculty members to determine how faculty are presently using research networks and how library-like resources available over the networks might aid them in their work.

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[7] Edwin Brownrigg, "Developing the Information Superhighway." in Parkhurst, Carol A., ed. Library Perspectives on NREN: the National Research and Education Network. (Chicago: Library and Information Technology Association, 1990) 59.

[8] Charles McClure et al., "Realizing the Promise of the NREN: Social and Behavioral Considerations." in Parkhurst, Carol A., ed. Library Perspectives on NREN: the National Research and Education Network. (Chicago: Library and Information Technology Association, 1990) 24.

Questions of bibliographic control and preservation of electronic information are other matters of serious concern. While staff at the University of Saskatchewan Libraries cannot by themselves address these issues in any broad sense, the Libraries can assume the responsibility to ensure that any locally-created databases intended for general use are properly described and preserved for network access.

3.8.3 Local Support for Scholarly Research

While research libraries such as the University of Saskatchewan have well-defined roles in the system of scholarly communication, it will be increasingly important to monitor two areas for changes. The first is that of local faculty and graduate student research. Presently over $4 million is spent annually to acquire library materials. The assumption is that these materials meet the teaching and research needs of faculty and generally faculty have expressed themselves reasonably satisfied with this collection, with the notable exception of current journal literature. However, faculty themselves might not even be aware that how they might describe their utilization of the system of scholarly communication might not match the reality of their practices. Librarians must also be alert to changes in the other components of the system and communicate their assessment of the potential impact of the change to faculty. The second area is that of publishing practices, including such things as journal price increases, private electronic databases, electronic journals and so on.

The Libraries also need to be cautious so as not to implement electronic services which faculty will not use. For example, it is now technically and (probably) financially possible to implement a comprehensive Selective Dissemination of Information (SDI) service incorporating electronic versions of such standard services as the Institute for Scientific Information's Current Contents and citation indexes as well as a monograph alerting service much like the now-defunct SELDOM service. The real question, however, is cost-effectiveness. Would such a service meet a broad demand? In other words, a careful market survey of user needs should be done before embarking upon any such venture.

3.9 Funding and Costs

3.9.1 Costs

The costs associated with information technology are beginning to consume a significant portion of the Libraries' and University's operating and capital budget. The cost of information technology is not declining. A recent report by Bob Kavanagh[9] demonstrates that the price of purchasing personal computer equipment is increasing at a 7% rate compounded annually. As more and more equipment is installed, the cost of maintenance and replacement is also rising.

The accumulated cost of software for various applications is increasing as more and more library staff have access to microcomputers and want to transfer work to them.

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[9] Robert N. Kavanagh and Edward S. Pokraka. Strategic Computing Directions and Opportunities for University-Government- Industry Partnerships at the University of Saskatchewan: Preparing for the Twenty-First Century. (Saskatoon : University of Saskatchewan, March, 1990).

The cost of the various electronic databases to which the Libraries offer local access will increase as more databases are added, yet the acquisition of electronic databases (numeric, bibliographic and full text) will not supersede the need to acquire print and non-print materials. The issue then is what should be the relative priority of electronic formats to other library acquisitions?

The cost of training staff will increase as the penetration of information technology increases and as changes and upgrades take place. The cost of the staff necessary to train the users will also increase. In the context of all library needs, what priority should be given to the assembly of resources to properly train staff and users? If no incremental resources are given to the Libraries, what internal reallocation is possible?

3.9.2 Funding

Assuming no real increase in the purchasing power of the operating and capital budgets available to the University and the Libraries, there are only a few options open to investigation.

The cost of replacing/upgrading major library support systems can be made more bearable by a strategy of modularization. If application packages, databases, and so on are mounted on separate servers and more of the processing power of the system is located on individual desktops, it will be possible to upgrade the systems in smaller bites. This strategy will not cost less, it will just reduce the need to find the financial resources for a very large capital expenditure in any one year.

The Libraries will have to seek strategic alliances (or "external organizational linkages," as one library annual report states) with other campus groups who may have resources to contribute to a project. Computing Services springs to mind and the Libraries are already relying heavily on the campus networking strategy. It may also be possible to form alliances with various hardware and software companies, or gain support in the form of provincial and federal grants for various types of program support involving information technology.

The staff necessary for training other library staff and library users will have to be found in an internal reallocation of priorities or be an increase to base budget. Alternative training methods, such as video and computer tutorials, should also be considered.

4. MAJOR STRATEGIC ISSUES

4.1 Upgrade Alternatives Within Geac

Section 3.6.2.1 described the present state of the Geac library system. There are five upgrade options within the Geac context.

Turbo 8000

Geac's "Turbo 8000" upgrade would be the most immediate means of increasing system throughput by approximately 30%.[10] This upgrade involves replacing the system boards in the CPU. The cost of the Turbo upgrade for the Dual 8000 system is $89,000. Maintenance is $1,670/month/CPU or a net increase in maintenance costs between the Dual 8000 and the Dual Turbo 8000 of $10,500 annually (at 1990/91 rates).

The advantage of the Turbo 8000 upgrade would be a limited increase in processing power while retaining existing software modules, hence no staff or user retraining would be necessary. The disadvantage of this solution is that it would be investing money in supporting old technology. The disk space limitations would remain, and it is debatable whether such an upgrade would provide sufficient additional processing power to support functional boolean searching or authority control. At best the Turbo 8000 upgrade would serve to extend the life of the current system for another two or three years.

Geac 9000 System

Upgrading to a Geac 9000 system would cost between $400,000 and $500,000. The upgrade can be performed in stages, with some functions migrating to the 9000 while others continue to operate on the 8000. Although some of the existing hardware (for example the 10 344MB drives) could be retained and staff and user retraining would be minimized under this option, the disadvantage of Geac's proprietary hardware, with its high purchase prices and maintenance charges, would remain. The Geac 9000 system still requires record transfers between the Bibliographic and the Circulation database, unlike most systems of modern design.

ADVANCE

Geac now markets a second library system known as ADVANCE for medium sized libraries, running on a variety of hardware platforms under the PICK operating system. The company has developed a procedure to allow their 8000 customers to migrate to the ADVANCE system. Unlike the Geac 8000 to 9000 phased migration, however, there is no incremental upgrade path between the 8000 and ADVANCE.

Upgrading to an ADVANCE system would cost $350,000 to $450,000.

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[10] Reported by three beta testing sites.

Geac 8000 - CD-ROM OPAC

Off-loading the online catalogue function to a CD-ROM based catalogue would represent another potential means to upgrade and extend the life of the Geac system. The initial cost of developing a CD-ROM online catalogue with 60 stations has been calculated to be at least $377,000; however, the annual cost of producing the CD-ROM catalogue would exceed the savings in Geac hardware maintenance by some $10,000.

A CD-ROM online catalogue would provide a user-friendly interface, powerful Boolean searching, and fast, consistent response time with a cost, however, of a high degree of system redundancy. New or changed bibliographic records and downloading circulation status information would require the online catalogue workstations to be networked with the Geac host, adding additional cost and operational complexity. Tape processing of new additions to the master bibliographic file would lengthen the time lag before new materials appear in the online catalogue (for example, monthly instead of the present weekly updates).

As in the case of the Turbo 8000, this option may only be considered as an interim step towards the complete replacement of the Geac 8000 system.

Conclusions on Geac Alternatives

The Libraries must ultimately replace the Geac 8000 system. Although a partial system upgrade or off-loading of functions may serve to extend the life of the current 8000 system, the preferred option, in order to modernize the system, increase capacity and reduce operating costs, is complete replacement.

RECOMMENDATION #1

That the Libraries completely replace the Geac 8000 system in order to modernize the system, increase capacity and reduce operating costs.

4.2 On Beyond Geac

The search for a new library system presents the opportunity to combine many of the currently separate functions into a single integrated system. This would have the advantage of being easier to manage, operate and learn than a distributed system, but with the debatable risk of "putting all our eggs in one basket".

A modern integrated library system should be able to perform most of the functions referred to in the previous section. In addition, it should provide other features not available in the current system:

a) it should be built upon a common bibliographic and holdings database, and allow sharing and exchange of data between all modules;
b) it should allow the searching of multiple files by a common user interface or command language;
c) it should have a flexible report writer which can be accessed directly by staff and allow the free flow of data between the host and the user's workstation; and
d) it should allow easy connection with external networks through the user interface.

4.2.1 Sources of Information

Information systems needs identified by evaluating existing local systems were documented in the Geac Audit (September 1989) and the Staff Survey Report (April 1990). Technological and other trends which have a bearing on post-Geac systems at the University of Saskatchewan Libraries were drawn from the ISAC Technology Scan sessions, other ISAC discussions and the published literature.

4.2.2 Technological Trends

Several trends in information technology (Section 4.7) will influence the choices to be made as the U. of S. Libraries move beyond the current systems configuration:

1) growth of telecommunications and networks on and off campus;[11]

2) distributed systems as an alternative to the turnkey integrated library system for obtaining functionality that meets local needs;

3) proliferation of databases, local and otherwise, available in various electronic formats - other forms of electronic information are becoming available (for instance, digitized graphics, statistical data, full text coupled with sound images and moving images and animation), which will have to be made available to users;

4) use of microcomputers by library staff and patrons and a greater degree of computer literacy in the user population; and

5) CD-ROM and other sophisticated media for information storage and retrieval—both as a means of acquiring external databases and for providing access to the Libraries' own collections.

4.2.3 Needs Identified by the Geac Audit and the Staff Survey

Desirable system features identified in the Geac Audit and the Staff Survey Report include, amongst others, the following:

Whole System Features

1) functionality on a variety of hardware and operating system platforms;

2) reliable support from vendors for both hardware and software;

3) a common bibliographic and holdings database to allow sharing and exchange of data between all modules;

4) less time- and resource-intensive daily operations than Geac;

5) capability to easily produce reports (for example, bibliographic extracts, circulation history, items newly catalogued);

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[11] Kavanagh, *op. cit.*

6) ability to interface the local system with other campus systems and external systems (for example, campus network, the University's financial and human resources systems, book and periodical vendors, remote online databases);

7) single workstation access to library, campus and external systems and networks, and ability to move data from one to the other;

Record Creation and Management

8) avoidance of redundant data entry and paper files;

9) full-screen editing for data entry in all modules;

10) real-time updating of indexes and records;

11) authority control, see and see also references, global update, multiple thesauri and authority files;

12) ability to accept and manipulate databases in other than MARC format;

Searching and Display of Information

13) sophisticated, flexible searching, including Boolean and free-text, search refinement by language, format, date and place of publication, library location, saving of searches, easy browsing within indexes and citation lists, ability to display more information in indexes and citation lists than the present system allows;

14) searching of multiple files by a common user interface or command language;

15) expanded range of subject access beyond the Library of Congress Subject Headings, including enhancements such as keywords, tables of contents, abstracts, book indexes;

16) sophisticated and flexible help features that can be tailored to varying user skills;

17) ability to move information to microcomputers for the creation of bibliographies and printing; and

18) improved display of serials information, specifically, item-level holdings and circulation status, linking of local holdings information to external bibliographic databases.

4.2.4 Future Information Systems

The preceding section of this report recommends replacing the Geac 8000 system in its entirety. The options are to:

1) replace the Geac system with another turnkey integrated library system; or

2) replace the Geac system with a number of linked modules mounted on network services (that is, a distributed system).

It is clear that the replacement system must be part of a configuration which provides access not only to the Libraries' own collections, but also serves as a gateway to sources of information outside of the Libraries and the University. The general configuration must be flexible and must accommodate growth and such recent and imminent developments as:

- increasing numbers of electronic databases (CD-ROM, INFOACCESS), and increasing demand for them by library users;
- SASK#Net and CA*Net, which effectively make the campus, with the Libraries, a node in a vast network of linked databases;
- services to off-campus users; and
- microcomputer use and capabilities.

An integrated approach has a number of attractions and advantages: only one vendor to deal with; one master database to maintain; no need to transfer data over inter-modular links; no concerns with compatibility among modules; and taking advantage of the University's commitment to Digital technology.

Recent articles by Lewis[12] and Bailey[13] have attempted realistically to characterize future library information systems. Some library directors, in an attempt to make system vendors aware of future needs, circulated a survey entitled "Online Information Systems: the Next Generation," to which ISAC responded in April 1989. In addition to features already listed in section 4.2.3., the ISAC response noted the following to be of primary importance:

- expandability without having to be replaced in entirety;
- adherence to OSI standards;
- non-stop operation and fault-tolerant machines;
- maximization of "self-help" by users (as the world of information becomes increasingly complex, users will have to approach systems at a basic level without librarian mediation); and
- artificial intelligence and expert systems are expected to have an important role in future systems.

RECOMMENDATION #2

That the search process for a replacement for the Geac 8000 system be preceded by a clear articulation of needs. The functionality of a new system should be determined by as close a match as can be achieved in a cost-effective manner between these needs and the technology available in the marketplace.

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[12] David W. Lewis, "Inventing the Electronic University," College & Research Libraries (July 1988) 49:291-304.

[13] Charles W. Bailey, Jr., "Public Access Computer Systems: the Next Generation of Library Automation Systems," Information Technology and Libraries (June 1989) 8(2):178-185.

RECOMMENDATION #3

That the future system achieve a seamless functional integration of the primary catalogue or catalogues, local and remote databases, and external networks. Users will be presented with a single system image, similar to INFOACCESS.

RECOMMENDATION #4

That the selection of the new system be strongly influenced by the provision of service on location by the system vendor or vendors. Fault-tolerant hardware will also be an important consideration in making a selection for a future system.

RECOMMENDATION #5

That the selection of the new system take note of the strong presence of Digital-based systems on campus.

RECOMMENDATION #6

That the methodology of seeking a new system focus on obtaining referrals from vendors to sites which are similar to this library. Systems can then be viewed in actual operation in order to determine which ones meet the Libraries' needs.

4.3 Office Technology & Automation

In April 1989 a detailed inventory was conducted to identify the extent and kinds of automation activities occurring throughout library departments. At that time the greatest concerns involved staff training and improved functionality of Geac – questions such as how to make better use of Geac, campus e-mail, and word processing.

The survey established that all library sites had a minimum of 4 Geac terminals - 2 for public use, 2 for staff use; 1 SKLIB/INFOACCESS terminal; and 1 microcomputer. This equipment was being employed for the following applications:

Geac: circulation and public or technical services applications;

SKLIB: electronic messaging, word processing, INFOACCESS;

Microcomputers:

word-processing, electronic communications to an online network (either remote database vendors or local in-house systems such as Geac and SKLIB), spreadsheet applications, specialized local functions such as CD-ROM, bibliographic database creation or customized bibliographic preparation.

Concerns for the future focused on: improving network access and shared resources; upgrading hardware to the minimum of a hard disk or acquiring new equipment; acquiring software applications programs for communications (downloading or file transfer), preparation of bibliographies and desktop publishing.

A year-and-a-half after the initial survey, the Libraries have upgraded all microcomputers to a minimum of 640K with a hard disk; all departments have ethernet access to the campus-wide network; e-mail applications, including accessing national networks, are heavily used; CD-ROM is offered in all libraries. Current automation concerns focus on: centralized laser printer facilities, standardizing on floppy disk size, shared data, data extraction, customized reporting and greater access to networked data and applications.

At any one time it is extremely difficult to pinpoint office automation needs since they are constantly evolving because of immediate and localized situations. The intent of the following recommendations is to rationalize the framework required to foster the development of office automation in the Libraries:

RECOMMENDATION #7

That the Libraries, in concert with the University's Computing Services, continue to operate a library network premised on servers either owned, or controlled, by the Libraries.

RECOMMENDATION #8

That a minimum standard for networked applications be identified for use by every library staff member. These might include MAIL, BULLETIN, NOTES, word processing, and access to laser quality printing.

RECOMMENDATION #9

That staff as appropriate have access to standard library management databases, on and off-campus communications gateways, and groupware applications such as scheduling and meeting planners.

RECOMMENDATION #10

That the locus for processing be the staff member's desktop. Wherever necessary, shared networking of software applications should be considered to facilitate workflow on a single data or resource set.

RECOMMENDATION #11

That where appropriate, local area networks within departments be used to maximize effective and efficient use of information technology provided such networks are compatible with the major campus-wide or library-wide networks.

RECOMMENDATION #12

That sufficient training be provided to ensure that all staff members can utilize the automation resources available.

4.4 Management Information

Management information traditionally refers to a wide range of statistical information on various aspects of an organization's operations. In the Libraries at present such statistical information is contained in a wide variety of manual and automated files. Automated systems are quite capable of generating an enormous number of statistics, but frequently statistical reports are not presented in a manner which the users find helpful. Even with a powerful report writer staff are likely to want to further customize the data.

Library staff interact with a number of other campus automated systems: the Financial Resources System (FRS), the Human Resources System (HRS), the Student system run by the Registrar's Office and others. Presently interaction with the

Libraries' systems is almost exclusively by means of paper records, so library staff have to deal with a multiplicity of reports on diskette and print-out.

Off-campus suppliers are rapidly adopting electronic interfaces – most notably Electronic Data Interchange (EDI) – for the exchange of purchase orders, claims and invoices for monographs and serials.

Library staff, themselves, are finding more and more ways to handle internal routines and manual files with computerized applications. With all this, however, there is very little standardization of application programs, documentation or procedural review in spite of the importance of these applications to library operations. The recommendations below address these problems.

Initially library space and holdings data and public service statistics should be designated for standardized sharing and common access. Other files which might be designated in the future include such things as library policies, procedures and the full text of minutes of certain committees.

Library-critical common files will have to have access (read, write, update) restricted to selected groups for reasons of privacy and security or system load. An example of the former might be the submission of hours for casual staff. An example of the latter might be a connection to the University's financial resources system.

RECOMMENDATION #13

That the Libraries identify critical management information to be made accessible on the network. All library staff should have read-only and download access to as many of these files as reasonable. Selected library staff should be able to enter, update and correct data in specific files from their local workstations. These files must be managed using common application programs supported by the Libraries and/or by Computing Services with formal training and documentation.

RECOMMENDATION #14

That the Libraries formally review and select the application packages to be used to support the Libraries' management information databases. Appropriate weight should be given to Standard Query Language (SQL) links and data import/export functionality. The object is to make it as easy as possible for library staff to upload locally collected data, to download information from central files and to customize reports and presentations locally.

RECOMMENDATION #15

That all library-critical applications be properly documented and properly managed for back-up, archiving and security of data.

4.5 Local Databases and End-User Searching

The Geac online public catalogue and the locally-created databases on INFOACCESS permit complete access to the Libraries' on-site resources to the level provided by traditional cataloguing although machine indexing and searching of some fields present in the bibliographic records may not as yet have been implemented. Studies conducted at several sites in North America of the manner in which users approach the online catalogue compared to the card catalogue reveal a far greater use of subject access. This suggests that there should be an investigation of content-enriched and enhanced subject access to University of Saskatchewan databases (including the Libraries' catalogues).

Content enrichment may include enhanced access to information already contained in the record as well as linking to the record or including in the record such things as: abstracts, book reviews, tables of contents and back-of-the-book indexes (in whole or information derived from these) and additional subject terms from thesauri.

RECOMMENDATION #16

That a committee of librarians be created to investigate policies and procedures for content enrichment and enhanced subject access to appropriate sections of the Libraries' collections.

While INFOACCESS and the CD-ROM database services provide indexes to some of the Libraries' journal literature, other sites have linked such tools to actual holdings. This would be a very welcome enhancement of traditional services.

RECOMMENDATION #17

That the feasibility of indicating local holdings of serials records in all relevant databases be investigated.

Mediated searches and searches for the most current material are handled through the online searching program, which for present needs is adequately funded and equipped, operating on a cost-recovery basis for direct costs and managed by a service coordinator. The program's objectives have been established by the Online Users Group.

User orientation and training to teach literature searching strategies and skills are handled presently with a general orientation program introducing users to library services and to both online catalogue searching and traditional index searching for journal articles. Specialist librarians are available for more specific bibliographic instruction. Education for end-user (non-mediated) searching such as CD-ROM varies from unit to unit, but is most frequently done as one-on-one training. At least one branch makes use of a college computer laboratory to schedule its online catalogue and database instruction sessions to classes of up to forty persons (two per terminal). The Libraries have for two years requested capital funds to establish an Information Literacy Laboratory, but so far have not been successful. Staff training is practically limited to one-on-one instruction and having staff attend commercial training sessions or ones arranged by professional bodies. The Information Literacy Laboratory is described in more detail in Appendix 5.

One functional end-user program is operated by a professional college within a campus library: Law. The College prepared the site within the branch library and retains operational control of the service; that is, provides operational funding and arranges with online database vendors for discounted educational accounts. Other professional colleges have similar computer laboratories close to branch libraries - Commerce, Veterinary Medicine, Chemistry, Engineering. In three instances, a college has purchased microcomputer workstations for library database subscriptions.

There is a growing trend for commercial database vendors to target a specific public of information users, namely professional groups such as lawyers (QL, Can/Law, WESTLAW), chemists (STN/Chemical Abstracts) and doctors (BRS Colleague or NLM Grateful Med).

There is a definite trend away from mediated searches and a demand for direct personal access to information services, whether they be online catalogues, locally-owned databases (INFOACCESS or CD-ROMs) or remote database vendor services. For example in 1986/87, before Psychological Abstracts became available on both INFOACCESS and CD-ROM, library staff performed 74 mediated literature searches. In 1989/90 this dropped to 29 mediated searches.

The 1989 INFOACCESS study of the three formats (print, CD-ROM, INFOACCESS) of Psychological Abstracts owned by the Libraries pointed out clearly that users prefer any automated search strategy to having to use a printed version.

End-user programs – certainly in the immediate future – will necessarily encompass a variety of services and electronic formats. Common to all, however, are the following issues:

- subscription costs;
- royalty or "pay-per-view" fees;
- duplication of print indexes;
- hardware costs;
- target audiences and the most effective ways of delivery to them;
- user perception of "free" services or charging of user fees;
- demand and cost efficiency; and
- impact on other library services such as traditional reference, interlibrary loans, and collection development.

RECOMMENDATION #18

That selection criteria for electronic databases include guidelines to aid in the choice of delivery mechanism; in particular, the criteria should give clear guidance as to which are best supported on INFOACCESS or networked servers and which on individual workstations.

RECOMMENDATION #19

That education programs include the teaching of judgement skills in making appropriate, informed choices of resources and tools as well as the mechanical skills of searching and computer access.

RECOMMENDATION #20

That service and educational programs be established which provide strong coordination for the seemingly divergent activities related to informational database searching (online searching, end-user searching and searching of locally owned database services such as the online catalogue, INFOACCESS and CD-ROM).

RECOMMENDATION #21

That a computer-based training facility be established in and managed by the Libraries. This facility would serve as an instructional or teaching laboratory in the use of informational database services.

4.6 Ownership Versus Access

4.6.1 Ownership

The traditional mission of a research library is to collect, organize and preserve information. This is reflected prominently in the Mission Statement of the University of Saskatchewan Libraries. The Research Library Committee has commented:

> Sheer quantity has, however, made self-sufficiency an unrealistic aspiration. In both collecting and building the bibliographic database interdependence is now an acknowledged but not necessarily fully embraced principle.
>
> The form of future library service will be shaped by . . . the growing number of print and non-print formats used to store information of interest, escalating requirements of users for access to everything of importance, new and rising costs, and the structural changes in the system of scholarly communication brought on by the interrelated technologies that are transforming how information is stored, organized, processed and transmitted.[14]

What information has to be made accessible on this campus to support the teaching and research needs of the University? In other words, what should constitute the core collection?

It is the Libraries' responsibility to ensure that the critical mass of materials needed on site to support the teaching and research programs of the University continues to be acquired. One may predict, however, that an increasing proportion of this critical mass will be in electronic form. Nevertheless, the impact of this change will be gradual and not uniform across the entire collection.

Since the Libraries already collect materials in many different formats – conventional print, microforms, maps, scores, compact discs, videotapes, cassettes, phonograph albums, software on floppy diskettes, and so on – how far should the Libraries' responsibility extend for the collection of electronically stored materials: numeric data, full-text and bibliographic reference databases?

If a selector determines that electronic materials are an appropriate acquisition, the Libraries should acquire the material. Once the electronic materials are acquired, however, considerations of access and storage may determine that they be mounted on non-Libraries-controlled storage devices. For instance, the recently acquired 1986 Census of Canada data sets are mounted on the main academic computing node for reasons of storage and backup, and because use of the tapes needs access to statistical programs that are not available on SKLIB.

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[14] A Statement from the Research Library Committee, (Washington, D.C.: Council on Library Resources, May 1990).

RECOMMENDATION #22

That the Libraries head a standing University committee to handle policy issues regarding electronically stored data files and software, and that the Libraries coordinate the central listing of accessible databases and software for the campus.

While electronic information will not materially reduce the volume of hard-copy acquisitions over the next decade, the proliferation of formats will actually increase the need for study and service space since the Libraries will have to provide increasingly specialized equipment to use the different formats.

RECOMMENDATION #23

That, in cooperation with the Office of Space Administration, the Libraries develop new formulae of entitlement for study and service space which make reasonable provision for new formats and for workstations or other equipment needed for use of the materials.

What should the selection criteria be for electronic formats and for choosing among formats? Selection policies will increasingly have to take into account the relative importance of information in different formats. In the case of reference databases, database selection criteria should be developed and administered by the proposed Database Users Group (see section 4.9.2). There is an hierarchy of choices among print sources, stand-alone CD-ROM databases, networked databases in the local catalogue and remote databases which must be considered when choosing what to add. Training of both library staff and end-users likewise becomes a consideration in selecting formats.

RECOMMENDATION #24

That library staff embark on a program of collection policies revision which takes into account choices of format, access costs, user-access issues, need for library intermediary, and ownership.

RECOMMENDATION #25

That the proposed Database Users Group begin the process of collection policies revision by addressing the issues related to reference (service) databases.

Amongst the management issues/strategies for organizing the integration of electronic resources into library collections is a central question of the relative importance of the Libraries' instruction and training programs (see also sections 4.3 and 4.8 of this report).

4.6.2 Access

What are the legal and ethical issues involved in providing equitable access to electronic resources? The legal issues are the rights of copyright holders and restrictions placed on access by the vendors of the databases. In either case, if these legal rights make the cost of local ownership or network access unreasonably expensive, then it may be necessary to forego offering the service. The ethical issue is primarily one of the information rich and the information poor. Library users with access to research grants may be able to afford better access to electronic resources than others without similar levels of funding. This may well create an unacceptable distinction in access to information.

RECOMMENDATION #26

That the Libraries adopt a policy of equity of access to all available services for the University community.

Other issues of access might be characterized as strategic to the provision of library services. Internet access to the Libraries' catalogues and databases is bound to create direct pressure for use of materials, followed by requests for document delivery from a local, provincial and – potentially – worldwide community of individuals and institutions. It will be necessary to define realistic expectations for, and limits to, inter-institutional cooperation in such areas as developing complementary collections, lending materials, regional storage space and preserving collections of historical importance.

Similarly, one can anticipate the immediate question of how one can integrate procedures of bibliographic verification, inter-library borrowing and document delivery into the vast menu of Internet resources.

RECOMMENDATION #27

That the Libraries develop policies and procedures to identify appropriate use of the Internet in conjunction with traditional and existing services such as interlibrary loans, reference and collection development.

RECOMMENDATION #28

That the Libraries develop, for both staff and users, a training program for use of the Internet and the resources to which it provides access.

4.6.3 Issues of Access and Ergonomics for the Handicapped

In continuing to address general issues of accessibility to services and programs, the Libraries need to pay particular attention to the needs of the disabled so that the latter do not become part of the "information poor". There are already devices available or in development which make such things as workstations accessible to those with various sorts of handicap; similarly, through networks or modem dial-up it is possible to make services available to the handicapped in an amenable setting to their needs, for example in a specially-equipped education centre which could be located in a library or in their home. Decisions for networking of catalogues and databases should take services to such clients into account, with special licensing permissions sought as needed. Within the Libraries, care in establishing ergonomics (location and aisle space, counter height, etc.) can do much to facilitate use of library workstations for those with mobility impairments, and such things as programs and equipment to enlarge monitor displays can help make services accessible to the visually impaired. Software packages designed specifically to help those with disabilities take full advantage of current technology are currently available at the University of Saskatchewan.

RECOMMENDATION #29

That an advocate[15] routinely screen current and proposed information systems to ensure that they are conveniently usable by the disabled and that access is possible with appropriate ease and independence.

4.7 Cost Control and Definition of Core Services

The Research Library Committee has also noted that:

> The budgets of research libraries are always complex and often incomplete - complex because they reflect a continuing capital investment in building and maintaining a research collection as well as the costs of current service and instructional support, and incomplete because, in most cases, such items as space costs and certain components of institutional overhead are seldom included. Funding is further complicated by the need to invest in the information technology now required with no clear sense of the magnitude of continuing costs, and by the growing number of costly commercial services being offered to libraries and their users.
>
> The capabilities of the information age cannot be viewed simply as an extrapolation of what has gone before. They are essentially additive, and the new costs as well as current funding realities suggest that some subtractions from established operating patterns will be required to keep accounts in balance.[16]

The critical question to be addressed is how can the purchase of electronic information be incorporated into the Libraries' operating budget while continuing to build the traditional on-site collection? The Libraries will no more be able to acquire every electronic database of interest than they are now able to subscribe to every journal of interest.

RECOMMENDATION #30

That a specific allocation be established within the acquisitions budget for reference database subscriptions and that an appropriate proportion of the acquisitions budget be set for this purpose.

Since almost all of the electronic databases which the Libraries will conceivably purchase or lease will be reference databases with print analogues currently in the collection, serious consideration should be given to a mandatory cancellation of the print subscription once library staff feel certain that the electronic source is satisfactory and that the preservation, ownership or access to historical data is reasonable for users. Current experience suggests that although there is usually a net incremental cost when an electronic reference source replaces a corresponding print product, the total cost – excluding purchase and maintenance of access equipment – is usually less than the cost of subscribing to both the print and the electronic products. The calculation of the net cost of electronic services is further complicated by issues of leasing the data, of paying for downloaded or accessed records, of network agreements for multiple access from library or campus terminals, etc.

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[15] Advocacy resource people might include: the University Ergonomics Officer, a representative of the Disabled Students Society, a disabled staff or faculty member, a library staff member willing specifically to assume this role.

[16] A Statement, op.cit.

Recognizing that it is impossible for any single institution to purchase and collect everything that is published and that it is equally impossible for scholars to travel to every institution holding materials relevant to their research, libraries – embracing a principle of universal access to information – developed an elaborate scheme of mutual support through interlending (interlibrary loan). This system depended initially on a large measure of good-will and cooperation, with each library absorbing costs to extend a "free" lending service to its patrons for a collection supplemental to its own holdings – a collection which, in fact, it did not own. With the growth of demand for use of their collections, some libraries found that they could no longer lend some physical items (typically journal volumes) but would photocopy extracts (within the guidelines of copyright) for scholarly use. To the costs of delivery this added further costs for paper and processing each request. Some libraries responded by trying to recover some of the directly identifiable costs and others had to go so far as to impose a transaction fee both as a deterrent to excessive use and as revenue support in order to be able to offer the service at all.

Simultaneously, the interlibrary loan operation has been confronted by the information publishing trade's selling copies on demand – microform, print or electronic copies of materials – identified through a variety of automated searching methods. Obtaining these materials is nearly always quicker than the traditional interlibrary loan (electronic downloading can be virtually instantaneous) bringing into the equation the factor of time: namely the need for immediate data ("hot" information) as opposed to being able to wait for data ("cool" information) and the value of time to both the library and to the researcher. Purchasing these materials in some cases costs less than trying to provide a lending copy and carries the end advantage of ownership.

Several questions now face libraries as the old models of on-site collections and interlibrary lending are challenged.

- Which information services form basic services which may be offered "free" or at nominal cost to their primary clientele and which may be offered charging cost recovery or fee for use?
- What are a library's obligations towards its clientele if access or use is offered in lieu of collecting and owning the material?
- If a library in effect purchases materials (photocopies, microforms, electronic files, data sets, etc.) through its access services where does ownership lie, particularly if the library chooses not to make the material part of its (permanent) collections?
- Where libraries have patrons with varying abilities to pay for services, is there a methodology for respecting the principle of universal access and for avoiding the "information rich" and the "information poor"?

- Can a library justify purchasing data or materials (complete items, subsets of data, searching or computer time) for patrons as a cost effective method of satisfying information needs when these cannot be justified or accommodated in the general provision of collections or services budgets? If so, under what circumstances?

The acquisitions, online searching and interlibrary loans budgets have been – traditionally and conceptually – all part of the mission to build collections and to meet information needs of faculty and students. The Libraries must educate both their funding agencies and their users in this holistic concept.

RECOMMENDATION #31

That the Libraries define in a wide and generous manner a set of core services for which no charges will be assessed. For other services, the Libraries should calculate the full cost of providing these services and then decide whether to charge a fee which will cover the partial or full amount of the direct and/or indirect costs.

4.8 Staff Recruitment and Training

The skills and characteristics necessary to provide the kinds of service envisioned at the University of Saskatchewan Libraries in the future must be specified. The Libraries must begin immediately to train existing staff for their future roles and to identify and hire new staff with these skills and characteristics.

4.8.1 Recruitment

Hiring of staff with broad backgrounds, varied experiences, new ideas and enthusiasm will provide flexibility. Pressure should be brought to bear on the profession at large to train library science students in innovative information technologies.

RECOMMENDATION #32

That the Libraries bring pressure to bear on the profession at large to train library science students in innovative information technologies.

RECOMMENDATION #33

That in the Libraries' hiring practices preference be given to candidates with experience in automated library services.

4.8.2 Training

Continuing educational opportunities are essential in enabling staff to stay abreast of new technologies and evolving user needs. In this light, the Libraries should appoint a staff development and training officer, who will give greater attention to coordinated staff training and development than is possible at present. There should also be a specific operating budget allocation for staff development and retraining. The Libraries must also enable their staff to update skills and provide them with opportunities for staying abreast of developing technologies. A trend towards "discipline oriented" staff development will be necessary.

RECOMMENDATION #34

That a staff development and training officer be appointed to coordinate and enhance training and development opportunities for library staff.

4.8.3 Organizational Changes

Librarians are going to be called upon more extensively to fulfill teaching and consultative roles in regards to information literacy. It may be necessary to further delegate responsibility for running day-to-day operations to support staff section heads to allow librarians to assume these roles. The Libraries also need to find additional technical staff positions to meet the increased demand for automated services and in-house support, especially for microcomputer-based applications. These positions may be created with additional operating budget support or by internal reallocation.

RECOMMENDATION #35

That additional staff positions be created to meet the increased demand for microcomputer-based services and in-house technical support.

4.8.4 Ergonomics

One of the major effects of the introduction of computers has been the controversy over the possible deleterious effects of video display terminals and the location and design of workstations. The University has appointed an Ergonomics Officer to address these issues. When the Geac system was installed the Libraries were careful of ergonomic factors and appointed a staff committee to make recommendations on furniture, workstation placement, and so on. With the continuing expansion of computer systems and the increasing numbers of microcomputers in the work place, the need to be mindful of ergonomics and other safety issues has grown greater.

RECOMMENDATION #36

That the Libraries ensure that proper attention and budgetary support is given to ergonomic factors.

4.8.5 Outlook

The development of a certain outlook amongst library staff must be promoted. Some characteristics of this outlook might include:

a) a more flexible approach to change;
b) an energetic, enthusiastic and friendly perspective;
c) willingness to share knowledge and ideas;
d) willingness to accept constructive criticism;
e) strong commitment to the Library;
f) creativity and innovation;
g) experimentation and risk-taking;
h) sense of humour and positive perspective; and
i) being part of a team, with an eye for the Big Picture.

In regard to recruitment and training as related to present and developing access involving information technology it is necessary to be constantly aware of the Libraries' needs and those of the staff. These needs must be reassessed continually in light of service needs. It will be necessary to update skills and provide opportunities for staying abreast of developing technologies.

4.9 Information Systems Planning and Management

4.9.1 An On-Going Framework

A successful transition to the library system envisioned by this report will require setting realistic priorities in terms of the projects and services which can be delivered. Appropriate consultation at the initial stages and wide communication of the resulting plans to both library staff and the university community will pave the way for acceptance and success. Ongoing monitoring of progress and annual adjustment of the Libraries' short-term objectives will be crucial in achieving that success.

Many of the identified needs may be remedied by proposals in earlier sections of this report for new positions and revised terms of reference for some committees. User and interest groups must at the same time be fit somehow into the Libraries' line management structure. ISAC concluded, nevertheless, that there will continue to be a need for a general advisory committee serving as a forum for plans and proposals to be opened for staff information, comment, debate and advice or recommendation.

The terms of reference of the present Information Systems Advisory Committee, slightly modified, could serve for the new committee.

RECOMMENDATION #37

That there be a standing Information Systems Advisory Committee.

This committee should be structured as follows:

Membership:

4 persons appointed by the Director of Libraries, plus the Head of Systems.

Chair: either drawn from LMAC or included in regular (quarterly) attendance in LMAC to facilitate awareness of system-wide issues and concerns and to optimize communication.

The four members shall be appointed on the basis of their demonstrated interest and expertise in automated information services.

Members will be appointed for terms which will ensure an orderly turnover of membership.

Terms of Reference:

a) To review all proposals for specific projects which involve information systems planning, development and implementation and to comment on relative priorities;

b) To provide library staff users of information systems with a forum for influencing the direction and formulation of policy for all aspects of these systems;

c) To consider the impact on the library system of new information technology as it is announced or becomes available; and

d) To report quarterly to the Library Management Advisory Committee.

Procedures:

The Committee will meet at least quarterly to hear reports from the Head of the Systems Department, to consider the impact on the library system of new information technology as it is announced or becomes available and specifically to consider automation proposals submitted by individuals, departments or groups within the Library.

4.9.2 The Geography of Systems Support

It has been noted in both the Library Staff Survey Report and Section 3.6.2.4 of this report that expansion of computing activity is outstripping the capacity of the Systems Department to support it. Expansion will continue.

Contributions to change will come from within and without the Libraries: innovative microcomputer applications envisioned by library staff to help them in their work, developments such as Electronic Data Interchange adopted by the Libraries' suppliers on the one hand and by the campus Business Office on the other, upgrades to software, hardware obsolescence, changing pricing and service structures.

Each development increases the burden on library staff, particularly on units (such as the Systems Department) with specific mandates for implementation, operation or education (of both staff and users). To the extent that resources are available elsewhere on campus, this burden is lessened. In particular, the Department of Computing Services provides a strong program of support and training for various microcomputer and Digital applications relevant to the activities of library staff. Computing Services also provides advice and management for various library applications such as PMARC and applications which are delivered over the campus network. Office Machine Services has been able to take over hardware maintenance for various dot matrix and laser printer products and will perhaps expand to take on more microcomputer maintenance.

RECOMMENDATION #38

That changes to the mandate of library units and committees be made to create a clear "geography" or division of responsibility for support of library systems.

ISAC proposes that this geography be as follows:

Locus of Responsibility (* = new)	Responsibilities
*Staff of Individual Library Departments[17]	– Individual applications. – Communication with the Systems Department and the Staff Development Committee. – Encouragement to seek answers and to share solutions with members of the Microcomputer Interest Group.
Systems Department	– Systems analysis and development. – Hardware and software maintenance for major library systems.[18] – Network communications (ethernet and multiplexer). – Training in library systems. – Documentation and security of library systems. – Installation and inventory of new microcomputer hardware and software. *– Technical support for CD-ROM network administration. *– Small systems support, including working with library staff to develop specific applications.
Specific User Groups	– Advice on library policy and procedures for specific modules and systems.

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[17] The Staff Survey report recommended that the formal designation of a departmental resource person for automated applications would provide a prescribed channel of information and expertise within each unit. ISAC members felt that resident "authorities" should be cultivated, should be given training opportunities and should be recognized for the valuable contributions to the library system. The Committee felt that expertise depended to a large extent on personal interest and ability (quite beyond the specific acquisition of skills used to perform one's assignment) and that this would develop naturally. It also noted the difficulty of formal designations in an environment where there is a great deal of staff movement on the one hand and the development of very specialized applications (using "favourite" software) on the other.

[18] A "library system" is a specific library or information technology system used or intended for (eventual) use in more than one library department or to communicate with agencies outside the library such as the University Business or Registrar's Office, the National Library of Canada, library consortia or networks, etc. For instance, although at this time ACUILLA is not operational in more than one library department, it is being developed for use in the Branches and is part of a library consortium plan for automating interlibrary loans.

Locus of Responsibility	Responsibilities
Microcomputer Interest Group	– User group for informal training and sharing of knowledge regarding microcomputer applications.
Dept. of Computing Services	– Training for specific University-supported applications (mostly in the area of office automation, Digital hardware and software and standard pc applications). – Developing and maintaining interfaces between various library and campus systems.
Office Machine Services	– Maintenance of hardware by University contract.
*Staff Training and Development Officer	– Other library training and counselling (including "technostress") through University (re)training programs and through the Libraries' Staff Development Committee.
Database Users[19] Group	*– Recommendation of databases to be made accessible over network/s. – Training on all multi-user databases whether mounted locally (for instance, INFOACCESS or networked CD-ROM) or remotely (for instance, DIALOG or the INTERNET).
*Information Systems Advisory Committee[20]	*– Quarterly review of reports from the Head of Systems. *– Annual advice on library and information technology trends. *– Specific review of and advice on all automation proposals submitted by individuals, departments or groups.

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[19] Renamed and restructured Online Users Group to include all librarians and staff making use of the automated databases. The Group will report to Public Services Department Heads Committee.

[20] New standing committee with the Chair participating in and reporting to LMAC (see above).

Locus of Responsibility	Responsibilities
*Orientation and Bibliographic Instruction Committee	– Generic library and information orientation packages. – Development of materials and staff instruction for the teaching of information literacy. *– Information Literacy Laboratory: that is, group bibliographic instruction and orientation (staff and users), individual training and specialized consultation. Scheduling (which may include use of library or university facilities) may be assigned to a subcommittee or library unit/s. Individual units and librarians will be responsible for the content and delivery of their own programs.

4.10 Reviewing Library Goals and Objectives

The Staff Survey Report put particular emphasis on the need for structured consultation, planning and communication for successful implementation of technological change. In the previous section of this report it was noted that ongoing monitoring of progress and annual adjustment of the Libraries' short-term objectives will be crucial in achieving that success. The ISAC Committee, therefore, recommends:

RECOMMENDATION #39

That the Library Management Advisory Committee review annually the short-term objectives and long-term goals of the Libraries with due consideration given to the recommendations and proposed strategies of this Report and of subsequent reports from the proposed standing Information Systems Advisory Committee in setting and prioritizing objectives.

5. AN INFORMATION SYSTEMS VISION AND PLAN

5.1 The University of Saskatchewan Libraries

While the recommendations enunciated in the previous sections of this Report address certain current issues and problems, they also anticipate a number of changes which will have an impact on libraries in the next five to ten years. It is hoped that the recommendations will help to pave the way for a smooth transition and adaptation to the anticipated changes.

The following sections contain an outline (in brief schematic form) of the situation envisioned in 1996 and in the year 2001. It is a pooling of ideas from the members of the Committee and makes no claim either to comprehensiveness or integration of all possible scenarios. Section 6.2 proceeds from this visionary sketch to suggest the steps of a first five-year plan.

5.1.1 The University of Saskatchewan Libraries in 1996

The Environment

Publishing Industry
- The "information explosion" will continue to accelerate.
- Commercial information providers will compete with library value-added services affecting any charge-for-service or charge-for-use schemes and may also challenge libraries generally as basic information providers.

The Computer Industry
- Faster and more powerful machines will be on the market.
- There will be vast increases in data storage capacity of computers.
- Networking and communications will be a given for normal functioning and service.
- Personal computers will be more expensive, but will provide far greater functional options.
- Virtually all staff functions will require computer literacy and a personal computer or terminal at each desk or staff station.

Societal Trends
- If the political structure and public perception of the country does not change radically, there will be less and less money for culturally-oriented activities, while "bread and circuses" leisure and entertainment will constitute more and more of public and private spending as a panacea.
- Aging of the population will call for specialized services which may have to be subsidized to be viable.

Educational Trends
- There will be tremendous growth of distance education "pushed" by provincial government agendas to "bring education to the people" and justified and abetted by pressure to save energy and environment.
- The learning process will be forced to become entertaining: "Infotainment".

Patrons

- Every student will have a notebook computer and modem.
- Students will be computer literate, with high expectations for instant electronic answers and satisfaction.
- Patrons will become used to and willing to pay a fair price for specific services or quality service: one of the measures of the latter will be speed of delivery.
- Patrons will increasingly expect to receive a copy of requested material in a format of choice regardless of its original format or "platform".

The Library

- Patrons will still visit the Library, but increasingly greater use of library services will be made by remote access: turnstile counts will drop. New statistics for library use activities will have to be found.
- Because more information will be stored and archived electronically on high-capacity devices (and data copied or transferred for patrons' use), incremental space requirements for traditional collections will begin to level off.
- Space formerly devoted to collections, however, may be needed for on-site workstations.

Role of the Profession

- There will be no room in the profession for the computer illiterate or the electronically unskilled.
- The role of librarians will shift to that of "information access consultants."
- The educative function in the academic library will be increasingly important and will have an ultimate goal of nurturing "information independence" or self-reliance on the part of library patrons.
- Although rapidly changing information trends may be somewhat balanced by systems' user-friendliness, patrons will have to return periodically to the libraries for updating of their skills and for continuing education in recent trends of information technology.
- Librarians themselves will be called upon to design public interfaces and automated patron access to services.
- All librarians involved in collection development and reference will have to be familiar with remote electronic databases as sources of information and as alternatives to locally-owned materials.
- Subject analysis and indexing skills will continue to play an important role in providing quality control of electronic information handled by libraries.
- Librarians will be subject specialists, with original cataloguing and classification part of their duties along with selection and public service activities.
- Because of increased competition from private sector information providers, the survival of librarianship will depend on the extent to which members of the profession can offer a value added service.

Collections

- Although the majority of acquisitions will continue to be hard copy and owned and stored in libraries, resources will be held, stored and accessed on a proliferating variety of formats.
- An increasing proportion of acquisitions will be in electronic format, some not even stored on library premises or equipment. For instance, statistical databases may be mounted on Computing Services hardware (where high powered software can extract and manipulate the data directly), while the Libraries assume the responsibility of managing access to the data.
- Increasing numbers of library holdings in multimedia formats will require provision of specialized equipment and high bandwidth networks.

- Acquisitions budgets will be redefined to encompass a larger perspective where – in lieu of acquiring, processing and housing documents of limited, specialized use – an increasing proportion of acquisitions funds will be spent on providing on-demand access to and delivery of documents held remotely by other libraries and commercial vendors.
- Assuming that the Libraries' needs for primary space for Health Sciences, Law and the sciences have been met, more of the hard copy collection will be placed in remote storage in order to make room for new services.

Services

- Service will be extremely labour intensive, delivered on a one-to-one basis although supported by a large amount of information technology.
- Core services will be defined for free universal use and user fees will be charged for customized or value-added services.
- A Library-Wide Information System (LWIS) will feature a "super catalogue" as well as access to other electronic library services such as interlibrary loan requests, a library bulletin board and electronic reference. The LWIS will be linked to a Campus-Wide Information System (CWIS).
- The "super-catalogue" will include records of local holdings as well as locally-mounted citation databases. These citation databases will be linked to detailed library holdings records. Local records will be enriched/enhanced. The "super-catalogue" will also offer gateways to various levels of remote information resources.
- The Libraries will administer a large component of teaching and consultation services through an Information Literacy Laboratory; teaching and consultation services will also encompass the management of access to data banks.
- Patrons will be able to take electronic information away in almost any format they find convenient.
- There will be much more "marketing" of library services.
- Much closer monitoring, analysis and evaluation of faculty and student use of library services and resources will inform administrative decisions: the need for staff with statistical and analytical skills will grow.
- Off-campus or distance education services will form a significant portion of the Libraries' activities.

Staff

- As more of the collection shifts to electronic storage, there will be a decreasing emphasis on traditional circulation and shelving tasks, although tasks associated with retrieval from remote storage sites will increase. Besides location, recall and document delivery, identification of appropriately "active" collections for precious prime space will become crucial.
- All staff will have a much higher level of technological proficiency.
- Almost every librarian will have responsibilities involving selection, classification and indexing and public service focussed on a campus-supported discipline.
- Either more librarians will comprise the staff or a significant shifting of tasks to skilled support staff will be required to enable librarians to spend more time on instruction and consultation services for faculty and students.

- Staff training and development will have assumed a very prominent place in terms of time and budget.
- More staff with technical specialities will work with librarians to help them deliver service to library users.

5.1.2 The University of Saskatchewan Libraries in 2001

The trends outlined in the previous section are likely to continue unabated. In addition, members envisioned some of the following:

The Environment

- With less need for processing, shelving, and circulating physical objects, the ratio of support staff to professionals will decline.
- A Library Module for Accessible Communications will be developed; it will be a PROM-chip-based device (similar to a bank card)[21] carried by the user virtually to "open the door" to the SMART library: that is to provide access to a variety of information sources to the limit of the built-in credit account. Alternatively a system of credit authorization tokens for services might be based on "electronic loonies".

Collections

- By this time there will be very heavy reliance on cooperative and remote resources coupled with high bandwidth document delivery for materials beyond the level of teaching resources and defined campus-supported specialities.
- A significant program of archiving and periodically transporting data from obsolescent formats to current technological "platforms" will be required.

Services

- There will be significant reliance on artificial intelligence (AI) and hypertext "front ends" to disguise the bewildering variety of locally-owned, locally-held and remote information resources available to users or to guide users through this maze.
- Libraries themselves will rely more and more heavily on information technology to design, customize and support their services.
- The Libraries will have established strong ownership of their role as the preservers of campus scholarly information, whether textual, numeric or multimedia and in a wide variety of formats.

Staff

- Staff will continue to be highly trained and focussed on helping users discover and use information.
- Initial library contacts will be handled by support staff in the context of active referrals to holistic librarian specialists: a virtual subject divisional library.

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[21] Experiments with such devices are now being conducted in Ontario.

5.2 A Five Year Plan

5.2.1 1991-1992

- complete discussion of ISAC Report with all campus groups
- convene library group to develop specifications for major new system to replace Geac
- gain University approval to search for new system
- convene group to redesign orientation and bibliographic instruction programs
- design an Information Literacy Laboratory, submit funding request
- establish a standing Information Systems Advisory Committee
- continue distribution of networked workstations to members of the Library Management Advisory Committee and to librarians and other staff
- continue implementation of networked-based information services
- begin analysis of serials control needs
- begin analysis of network delivery of other library services such as reference and inter-library loans
- begin formal negotiations with Computing Services for distribution of responsibility for providing access to campus databases
- begin needs analysis for information systems training
- develop training program for access to Internet resources
- continue to add INFOACCESS and CD-ROM databases

5.2.2 1992-1993

- complete search for major system upgrade, complete negotiations, begin installation
- continue distribution of networked workstations to staff
- construct Information Literacy Laboratory, train staff
- begin implementation of serials control system (this may be a component of the major systems upgrade)
- begin design work for LWIS interface
- implement formal programs of information systems training for staff
- seek funding (or use resource reallocation) for small information systems experts to support librarians
- seek funding (or use resource reallocation) for staff development and training officer
- begin formal training of librarians in skills for new roles (these may be classification, information services and/or selection)
- begin to work with Space Administration to develop standards and formulas for study and space which will accommodate new methods of information delivery
- begin program of systematic revision and updating of collection policies to take into account choices of format, access policies and so on.
- begin analysis of management information and common application packages

5.2.3 1993-1994

- complete installation of major system upgrade
- continue implementation of serials control system

5.2.4 1994-1995

- catch up on first two years

5.2.5 1995-1996

- catch up on first two years
- begin to plan for next five years

Figure 1 illustrates this plan.

6. REALITY SCAN

Many factors will affect the success of the plan outlined in Section 5.2. Chief among the positive factors are the energy, ability and enthusiasm of library staff, the resourcefulness and leadership exhibited by the Department of Computing Services and the support which the campus community and University Administration have given the library. The Information Systems Advisory Committee has counted on the continuation of these factors when making its recommendations.

There are many other factors and events which could, however, enhance or impede the pace at which all of the recommendations can be implemented. It seems prudent to flag as many of these potential events as possible in order that those persons responsible for managing the various parts of the plan might be alert to their consequences and adjust matters accordingly.

6.1 Events Which May Enhance the Ability of the Libraries to Implement the Plan

Level	Event	Consequence
CAMPUS	Higher than expected operating budget increases:	- Could recruit specialist staff; - More "room" to absorb hardware and software maintenance.
	Higher than expected capital budget increases or high priority given to library projects:	- Able to replace Geac 8000 sooner; - Able to build Information Literacy Lab sooner.

Level	Event	Consequence
	Strong support for directions outlined in ISAC report:	- Faster implementation of prioritized projects.
	Campus participates in hardware or software cooperative programs:	- Opportunity to implement a portion of the plan.
PROVINCE	Increased support for off-campus distance education:	- Funding for the technology and staff necessary for the delivery of library services.
REGIONAL	Decision to promote regional cooperation:	- Cooperative/consortial activities encouraged or facilitated.
INTER-NATIONAL	Database licensing fees reduced:	- Opportunity to build a comprehensive and affordable local multi-user database searching service.

6.2 Events Which Would Impede the Ability of the Libraries to Implement the Plan

Level	Event	Consequence
CAMPUS	Lower than expected increases in the operating budget:	- Frozen funding for new positions or hardware and software maintenance costs; - Fewer purchases of new workstations for staff and increasing obsolescence of current machines; - Sharp competition between "traditional" acquisitions and electronic reference databases.
	Lower than expected capital budget resources:	- No funding for major equipment creates a backlog of upgrades for all major campus systems; - Slower rate of connection of faculty offices to the campus network; - No funding for Information Literacy Laboratory.

Level	Event	Consequence
	Faculty desire for the Libraries to remain "traditional" or "local collections centred:"	- No support for directions in ISAC report.
	Impact of new President, new V-P (Academic) and campus review process:	- Major program changes might require incremental resource allocation or major reallocation.
	Information needs or expectations of new faculty are unsatisfied:	- Libraries are bypassed for other information providers: on/off campus, commercial and other.
PROVINCE	No support for university higher education:	- Low operating and capital grants.
	Poor economic outlook:	- Slow progress replacing Geac or upgrading all other areas.
	Activities of other major library players (SLA's VISION, U of R Library's MURLIN/REGLIN, no support for a Sask Lib Network):	- May conflict with directions U of S Libraries wish to take.
REGIONAL	Regional cooperation develops:	- May conflict with directions U of S Libraries wish to take.
CANADA	Decline of federal support through NRC, ISTC, for CA*Net and NR*Net:	- Network service becomes more expensive.
	Federal support for research declines:	- Lower financial support.
	Federal support for higher education declines:	- Lower financial support.
	Telecommunication costs increase:	- Searching and document delivery costs increase.
	Canadian dollar declines:	- Stress on acquisitions budget could reduce support for information technology.

Level	Event	Consequence
	Inflation increases:	- More stress on operating budget.
	Imposition of fees for federal information services:	- More stress on operating budget.
	National information policy, copyright, GST on information, restrictions on dissemination of gov't or "private" information, pure or "directed" research:	- Increased operating costs; - Exacerbation of information rich vs. information poor situation; - Inroads on intellectual freedom.
INTERNATIONAL	Internet progress and funding falls short:	- Libraries cannot rely on the "access" model to meet local needs.
	Insufficient or saturated bandwidth to support document delivery:	- Libraries bypassed for information needs.
	Scholarly communication increasingly electronic:	- Libraries bypassed for information needs.
	Library automation marketplace stagnates because of small market size:	- Innovation slows or halts.
	No progress in standardization:	- Reduced portability of application. - Increased technology and costs for intercommunication.
	Ownership of information (i.e. will scholars regain control over scholarly communication and promote access at nominal costs?):	- If commercial ownership increases, libraries will pay more.
	Fees increase for document delivery or pay-per-use:	- Increased operating costs.
	Pricing structure for CD-ROM vs. remote database utilities radically alters to favour remote access:	- End-users are encouraged to bypass libraries. - Reevaluation of the elements making up a library's "Super Catalogue."

Figure 1: INFORMATION SYSTEMS ADVISORY COMMITTEE
5 YEAR PLAN

	EVENT	1991/92	1992/93	1993/94	1994/95	1995/96
1.	Replace Geac	Discuss and Search	Search and Acquire	Implement	Implement	Evaluate
2.	Bib Instruction	Develop specs	Imp new program			
3.	Inf Lit Lab	Design & req fund	Get fund and build			
4.	Workstation Dist	To LMAC & libs	Lib & lib staff	Upgrade	Upgrade	Upgrade
5.	Serials Apps	Needs analysis	Implement	Implement		
6.	Library-Wide Information System	Needs analysis	Design	Implement		
7.	Campus Information Sources	Talk to Comp Services	Design	Implement		
8.	Inf Systems Training	Needs analysis	Implement			
9.	Small Systems Staff	Seek Op Bud Supp	Recruit or realloc			
10.	Staff trainer	Seek Op Bud supp	Recruit or realloc			
11.	Redef Space Stds	Talk to Space Adm	Analyze stats Request needs			
12.	Analyze and Imp Mis	Analyze	Implement			
13.	Plan for 2d Half					Needs analysis

Appendix 1: The Information Systems Advisory Committee

A brief overview of the activities of the Information Systems Advisory Committee is contained in Section 3 of this report. This appendix is a more formal record of the Committee's work.

Draft terms of reference for ISAC were distributed for comment on August 23, 1988. The final terms of reference were:

a) To recommend a general policy framework and overall direction for the development and implementation of electronic information systems in the context of the Libraries' current and future information services;

b) To review all proposals for specific projects which involve electronic information systems planning, development and implementation and to make recommendations on relative priorities;

c) To solicit advice from the Systems Department on information systems and to recommend action on specific information systems issues;

d) To consult with library staff about electronic information systems projects and proposals;

e) To report to the Director of Libraries through Management Team.

The procedures were:

> The committee will meet at the call of the chairperson. The chairperson shall report regularly to Management Team (and to any other groups as appropriate) on the work of the committee. The chairperson shall submit a report annually to the Chief Librarian on the committee's activities. Subject to the approval of the Director of Libraries, the committee may create such sub-committees as it feels may be necessary to accomplish any of its tasks. The membership of these sub-committees need not be limited to the members of the committee.

The committee's membership was:

Wilma Sweaney	Chair
Chris Adams	
Gary Armstrong	To September, 1990
Ann Doyle	To May, 1990
Audrey Driscoll	
Sandy Finlayson	
David Fox	
Bill Hudgins	From September, 1990
Jessie Kurtz	
Ian Nelson	
Pat Parnell	To January, 1989
Frank Winter	
Lorna Young	From February, 1989

The first meeting was held on November 3, 1988. The full committee met 44 times. In addition there were many hours of work by individuals and sub-committees in preparation of the long-range plan:

March, 1989	Inventory of the Libraries' information systems
May, 1989	Study of user preferences for specific index services - print, locally-mounted tape service or cd-rom
September, 1989	Geac audit
February, 1990	Technology Scan (the program is contained in Appendix 2)
April, 1990	Report of the ISAC Staff Survey Sub-Committee (Executive Summary and Recommendations from this report are found in Appendix 3. The full Staff Survey Report may be consulted in the Library Administration Office.)
December, 1990	ISAC editorial committee constituted and begins meeting.

In addition, there were many reports written in response to specific issues which were referred to the Committee during its existence. These included reports on the replacement of the multiplexer, recommendations for criteria, procedures and databases to be added to INFOACCESS and responses to various capital equipment and networking proposals.

Appendix 2: Program of the ISAC Technology Scan

The Technology Scan is being presented by the Information Services Advisory Committee (ISAC) in order that committee members and other library staff can be sure that developments in information technology and related areas which will be critical to the success or failure of the Library in the next 3 - 5 years have been identified and discussed. Each session in the Technology Scan will be presented by an ISAC member or a campus expert who has identified the leading developments in each area. ISAC expects that these presentations will provoke questions and comments form the audience which will further illuminate the challenges and opportunities ahead. This information will be used with the results of the staff survey and the other research which ISAC has done to serve as the basis of ISAC's recommendations for a long-term strategy for the Library's information services.

There will be two sessions, each lasting approximately 20 minutes, each noon hour. All sessions will be in Room 161, Murray Building, starting at 12:15 p.m.

Tuesday, February 6, 1990

David Fox

CD-ROM OPACS: An overview of the typical features of CD-ROM public access catalogues and an examination of the costs of implementing a CD-ROM catalogue at the University Saskatchewan Library. Examples of CD-ROM catalogue retrieval software will be available for review and there will be a handout describing CD-ROM catalogues in Canada.

Chris Adams

CD-ROM and locally-owned databases: With the advent of compact disk technology libraries have experienced pressure from clients and information suppliers to buy and offer both databases and reference resources in the compact disk format. Similarly with increased reliance on mainframe computer networks for data processing, data storage and electronic transfer, database creators are aggressively marketing their databases in magnetic tape format ready to run on local mainframes. The University of Saskatchewan Library currently offers both CD-ROM and locally-owned databases (InfoAccess) so this discussion will introduce the technology, the current issues – including cost, training and staff involvement – as well as looking to what is happening at other places and what might conceivably happen here.

Wednesday, February 7

Terry Roebuck

Office Automation: This presentation will cover the major directions in Office Systems Automation from a University of Saskatchewan perspective. Some of the major issues to be covered will include distributed and end user computing with an overview of competing technologies from DOS, APPLE and other vendors as well as future technologies in the WINDOWS, OS/2, VMS and UNIX areas. A brief overview of mainframe office systems futures and directions will also be presented.

Sandy Finlayson, Lorna Young, Bruno Konecsni and Anne Marie Moulin

Staff training and ergonomics: How do we efficiently teach people to use the technology needed for their jobs? Implicit in this question is the assumption that the technology will serve as an opportunity for staff development as well as assisting with the task at hand. Once trained, how can we insure that the physical environment of the workplace contributes to a comfortable and productive work experience?

Thursday, February 8

Frank Winter

Organization models: "Everyone says" that one of the primary effects of the ever-increasing use of information technology in library operations is to enable/cause academic libraries to review/alter their organizational structures. However, it is extremely difficult to find concrete examples of such reorganizations. What factors might be used to determine the best future organizational structure for the University of Saskatchewan Library?

Jessie Kurtz

Cooperative activities: This presentation will provide a brief overview of cooperative activities within the province of Saskatchewan. There will be a review of the implications of networking activities such as union lists, campus and regional databases and so on upon the University of Saskatchewan Library.

Tuesday, February 13

Ann Doyle

Integrated and distributed systems: Murphy's Law of Computing no. 121 says, "If you consult enough computer experts it is possible to confirm any opinion." This session will explore Murphy's Law in the context of the debate about distributed and integrated systems. We will explore the issues by first defining them and then by looking at some of the relative merits of each type of system.

Wilma Sweaney

Document delivery: "The delivery of the document (book, article copy, etc.) to the reader is the be-all and end-all of library networking and cooperation although this is not always apparent." This presentation will cover developments in interlibrary loans, including facsimile transmission and commercial pay-per-use full-text databases. There may even be some discussion of electronic journals.

Wednesday, February 14

Audrey Driscoll

Subject enhancement and authority control: Authority control is a process of maintaining consistency among the access points of a database and providing reference for users. Subject enhancement is the provision of additional subject access beside traditional subject headings. The presentation will discuss available options for providing these features in an online catalogue and the issues which must be considered.

Terry Roebuck

Hypertext: From the conceptualization of hypertext data manipulation in the 1940s to the introduction of the Macintosh HYPERCARD, this presentation will cover the major areas of the interest in hypertext systems, review the capabilities and the weaknesses of modern hypertext systems, and demonstrate what all the "hype" is about hypertext and hypermedia processing modes.

Wednesday, February 21

Gary Armstrong

Access to remote databases: Online searching began over 25 years ago with the advent of computerized journal indexes. Today online searching is changing with advances in information technology. This presentation offers an overview of current developments and trends in online searching and access to remote databases.

Chris Adams

End-user searching: End-user searching refers to online searching done directly by users themselves – that is, without the aid of a librarian. Examples of this are lawyers and doctors searching legal or medical databases from their offices or homes. The presentation will discuss the historical roots of end-user searching, the end-user services currently available, the technology required, and what it might mean for the University of Saskatchewan Library.

Thursday, February 22

Victor Wiebe

Reference automation: A brief review of the technological change that has occurred in reference departments in Canadian academic libraries will be presented. This will be followed by an indication of where we are headed in the next 3 to 5 years with speculations on the best way we should go to get there and comments on how in reality we will be travelling to the future of reference automation.

Frank Winter

Telecommunications networks: Telecommunication networks are becoming increasingly central to the effective delivery of library services. Unfortunately, the structure of these networks is becoming increasingly complex and difficult for individuals to comprehend. What are the most critical aspects of in-library, on-campus, regional, national and international telecommunications?

SESSION PRESENTERS

Chris Adams, Coordinator, Online Services

Gary Armstrong, Science Librarian

Ann Doyle, Systems Librarian

Audrey Driscoll, Head, Cataloguing Department

David Fox, Head, Systems Department

Sandy Finlayson, Reference Librarian,
Government Publications, Maps & Microforms

Bruno Konecsni, Personnel Department

Jessie Kurtz, Head, Circulation Department

Anne Marie Moulin, Systems Department

Terry Roebuck, Manager,
Office Applications, Dept. of Computing Services

Wilma Sweaney, Head, Health Sciences Library

Victor Wiebe, Head, Reference Department

Frank Winter, Associate Librarian

Lorna Young, Music Cataloguer, Cataloguing Department

Appendix 3: Executive Summary and Recommendations of the ISAC Staff Survey Sub-Committee

[The full report can be obtained from Library Administration.]

1. Introduction

The final report of the ISAC Staff Survey Subcommittee represents over a year of work from the subcommittee members: Lorna Young (chair), Ann Doyle, Sandy Finlayson and Ian C. Nelson. The Staff Survey Subcommittee reports to the Information Systems Advisory Committee, which in its turn reports to the Director of Libraries.

The entire survey would have been impossible without the cooperation and hard work of many people. The subcommittee would especially like to acknowledge Rose Rode, Library Administration Assistant, for her scheduling (and re-scheduling!) of the unit interviews and for the final formatting and production of the report and Gail Rothery, Library Administrative Services, for much work in collating many individual documents into the final report. Special mention is also deserved by Ian C. Nelson, who devised the score sheet and encoded the unit responses, in addition to the subcommittee's normal load of interviews and analysis and the demands of his own position.

Finally we would like to thank all of the Library's staff for participating in the ISAC Staff Survey. Your input was valued and the Staff Survey Subcommittee has striven to reflect your views.

2. Survey and Analysis Methodology

2.1 History of the Survey

Part of the Information System Advisory Committee's mandate is "to provide Library staff users of Library electronic information systems a forum for influencing the direction and formulation of policy for all aspects of these systems" and "to consult with Library staff about electronic information systems projects and proposals." These two mandates are inextricably related to its primary mandate of recommending "a general policy framework and overall direction for the development and implementation of electronic information systems in the context of the Library's current and future information services."

In March 1989, ISAC agreed to adopt the "Campbell methodology"—a library system planning methodology drawn up by Bonnie Campbell, a Toronto-based library automation consultant. Consulting with staff regarding their present and future concerns with library systems comprises an important part of that methodology.

Coinciding with this decision was the completion of the audit of the Geac Circ module and discussion of its possible use as a model for auditing the other Geac modules. The idea of surveying all library staff regarding their concerns with all of the Library's electronic information systems developed from these two documents.

Ian C. Nelson and Lorna Young were given the initial responsibility for drafting the survey and were later joined by Sandy Finlayson and Ann Doyle.

2.2 Methodology

A final version of the survey was approved by ISAC in June 1989.

The administration of the survey was performed in two parts. The survey instrument was mailed to all unit heads with a covering memo, asking them to discuss the survey with their unit and prepare a written consolidated unit response. Pairs of survey team members were then scheduled to meet with each unit at a unit meeting specially called for that purpose. For the most part, each pair had access to the unit response before the visit occurred. Unit interviews began in September 1989. Each pair was assigned three or four units, with a mix of technical services and public service units.

During the unit visits, one survey team member functioned as a facilitator and the other as a recorder. Drawing on the unit's written consolidated response, the facilitator encouraged the unit to expand on its response, particularly with regard to the sections "My problem with _____", "What I really would like to do ..." and any "focus questions" for the unit: that is, questions for which the unit response was diverse, complex or needed more explanation than appeared in the written response.

The recorder wrote up the results of each interview. As common points of concern began to emerge during the survey, a score sheet was devised. Each unit interview and response was coded into the score sheet until a final composite score sheet was compiled. All unit interviews were complete by October 1989 and final scoring was completed by December 1989.

2.3 Analysis

Analysis began in January 1990. Each survey team member volunteered to examine the score sheet, unit responses and interview records for various topics. Summaries of the responses and recommendations for each topic were devised and compiled into a final draft report. The draft report was submitted to ISAC for its approval in March 1990 and subsequently released to the Director of Libraries and all unit heads.

3. Executive Summary of Recommendations

RECOMMENDATION # 1

That the training needs for discrete systems (e.g. Geac, InfoAccess, various PC applications, CD-ROM set-up and searching, LAN management) be identified together with required in-house staffing support .

RECOMMENDATION # 2

That while maintaining a first priority of adequate functionality for office automation, the Library seek a direction which would embrace either integrated programs or a common standard of user-interface for ease of training and transportability of skills .

RECOMMENDATION # 3

Reactions to workflow were so extreme, that it is clear that immediate attention to this matter is needed. This should take the form of dealing with the present situation and it should also include thorough consultation about future developments.

RECOMMENDATION # 4

That the Library undertake to educate all users regarding the rationale for Geac systems policy decisions that affect system functionality identified in this document.

RECOMMENDATION # 5

That the Library undertake to inform staff on a regular basis of the Systems Department project list.

RECOMMENDATION # 6

That the Geac manager actively pursue report solutions with other Geac sites and users' networks.

RECOMMENDATION # 7

That, given the present 'maturity' of the installed Geac system, the Systems Department – with staffing or contract support from the Library if necessary – fix a high priority on the development of Geac reports so that Library functions and services can be enhanced through maximum exploitation of the integrated system.

RECOMMENDATION # 8

That regular or periodic sessions to explain and review Geac reports and to receive feed-back from staff users become a scheduled activity for staff involved in designing these reports.

RECOMMENDATION # 9

That the various individuals and units making use of bibliographic software pool their expertise in order to create a direction and a standard for the management of bibliographical information in general and in particular information which may be derived from Geac and InfoAccess or other local databases.

RECOMMENDATION # 10

That the Systems Department undertake to identify the reasons why Geac maintenance is slow and investigate means by which it can be improved or investigate alternatives.

RECOMMENDATION # 11

That all Geac staff terminals be provided with access to printing facilities.

RECOMMENDATION # 12

Assign a systems operator to focus on any possible improvements to the acquisitions online. For example, setting up more function keys and collecting reports software from other sites.

RECOMMENDATION # 13

Include Gtalk software in the Systems Department's project list and give the downloading of acquisitions information a high application priority.

RECOMMENDATION # 14

Give Acquisitions small systems support to facilitate communications and file transfer.

RECOMMENDATION # 15

That Management Team review the Acquisitions online hours to determine whether they are adequate or not, and if extended hours should be investigated.

RECOMMENDATION # 16

That the Circulation Users' Group review the circumstances under which Soft Backup is to be used.

RECOMMENDATION # 17

Include the Micro Backup software on the Systems Department project list and investigate the relative merits of using Micro Backup rather than Soft Backup.

RECOMMENDATION # 18

Investigate whether there are alternative methods of retaining and reporting historical circulation data.

RECOMMENDATION # 19

Include the investigation of inventory control options on the Systems Department project list.

RECOMMENDATION # 20

That the Circulation Users' Group review the issue of patron access to their own records.

RECOMMENDATION # 21

That the choice of indexed tags in MRMS be reviewed by TSCG and the Library Systems Dept., with a view to including at least title tags and call number tags in EBIB.

RECOMMENDATION # 22

Towards the next RFP: future cataloguing systems must include the following:

full screen editing
real time shelflisting
global update and authority capability.

RECOMMENDATION # 23

That options to the current OPC which would allow Boolean searching be investigated (e.g. CD-ROM OPC).

RECOMMENDATION # 24

That the possibility and implications of 2-line display of title and author tags on the BRF screen be investigated by the Systems Dept. and the effects of such a change be communicated to PSDH and TSCG.

RECOMMENDATION # 25

That the Library actively seek an automated serials check-in and control system which may be accessed (i.e. read) from any library unit. Public query for the latest current issue and holdings should also be included.

RECOMMENDATION # 26

Towards the next RFP: The next system must include the ability to display circulation status for serials volumes.

RECOMMENDATION # 27

That the Library continue to pursue the acquisition of more databases for InfoAccess. These should reflect the needs and interests of the University community, and where possible, should have the widest possible historical coverage.

RECOMMENDATION # 28

Investigate the possibility of indicating local holdings of serial records in all relevant databases.

RECOMMENDATION # 29

That the possibility of fulfilling a community or provincial mandate through InfoAccess be exploited. Licensing questions for each mounted database must be thoroughly investigated.

RECOMMENDATION # 30

Formalize the troubleshooting of microcomputer software and hardware a) with a distributed approach, i.e. having specific persons in each unit designated as the troubleshooters for that unit and ensuring that they receive the training appropriate to that responsibility (e.g. advanced software courses through Computing Services, hardware training through Library Systems if necessary, etc.) and b) by establishing and funding a small systems coordinator/consultant position.

RECOMMENDATION # 31

That a current inventory of software being used by the Library be displayed on the SKLIB bulletin board.

RECOMMENDATION # 32

That an advisory body on microcomputer applications and hardware be formed, perhaps as a standing subcommittee of ISAC. Similarly to the InfoAccess Database subcommittee, it could incorporate non-ISAC members and be broadly representative.

RECOMMENDATION # 33

That the Library continue to provide more public workstations with good security. These should be distributed in such a way so that those departments which presently do not have stations are given top priority.

RECOMMENDATION # 34

That educational instruction services be actively developed to establish the Library's role in bibliographic management. This would include such things as instruction in bibliographic searching and maintaining bibliographic databases.

RECOMMENDATION # 35

Considering the generalized misconceptions about e-mail, it is recommended that Library users receive additional information on its capabilities, specifically, the editing features, the existence of NetNorth and Bitnet, PC Link, and verifying if a message was sent.

RECOMMENDATION # 36

That a specific task force be struck to examine the automation of ILL and document delivery and that the task force include representation from units directly concerned with ILL services, viz. Reference, Health Sciences, other Branches, from Systems and from any areas of the Library which would benefit from reports derived from the service, in particular Collection Development and Selectors .

RECOMMENDATION # 37

That online access to HRS be negotiated with the University Personnel Office, preferably allowing the Library Personnel Officer and the Library Personnel Assistant write/update access to selected fields within the records.

RECOMMENDATION # 38

That the Library seek support from the University Administration and Computing Services to program FRS permission codes at the sub-account level, in order to permit limited access by Library managers responsible for specific accounts, e.g. acquisitions.

RECOMMENDATION # 39

That the Library request electronic transfer of data from the following Library accounting systems as a means of initiating University payments so that both the Library and University systems are as closely in sync as possible:

Geac CIRC
Geac ACQ.

RECOMMENDATION # 40

That direct electronic billing to FRS accounts be investigated for other Library services, e.g. ILL, online searches, FAX, etc.

RECOMMENDATION # 41

That, as a component of an overall information systems strategy, the Library commit itself to providing an environment where file sharing and transfer is facilitated for all activities, and that paper files be reduced as much as possible.

RECOMMENDATION # 42

That the Administration Group, PSDH and TSCG identify points of data entry (including manual entry on paper copy) for all library activities, including the number and rank of staff positions performing the task(s) for their respective areas.

RECOMMENDATION # 43

That the Administration Group use the above list to take whatever steps are necessary to minimize the redundancy of data entry activities across the Library.

RECOMMENDATION # 44

That, in light of the following statement by Patricia Battin, ISAC draft a geography of systems development and support in the Library in order to initiate discussion of the support and coordination of systems by Management Team and Administration Group.

> "We are bounded by human capacities to organize and control technology. The financial and organizational structures developed in the nineteenth century which continue to govern our academic institutions just don't work any longer."
>
> Nelson, Nancy. "Electronic Libraries: Vision and Implementation". Computers In Libraries. February 1990. p 8.

APPENDIX 4: UNIVERSITY OF SASKATCHEWAN DATA from STATISTICS BOOK VOLUME XVI 1989/90

College	Numbers of Courses									
	Dept.		Faculty		Undergrad		Grad		Totals	
	#	%	#	%	#	%	#	%	#	%
Agriculture	7	12.3	58	8.9	74	8.7	27	10.5	101	9.1
Commerce	4	7.0	56	8.6	63	7.4	30	11.7	93	8.4
Dentistry	1	1.8	31	4.8	56	6.6	0	0.0	56	5.0
Education	7	12.3	83	12.7	128	15.0	66	25.7	194	17.5
Engineering	6	10.5	84	12.9	197	23.1	81	31.5	278	25.0
Law	1	1.8	21	3.2	61	7.2	1	0.4	62	5.6
Medicine	18	31.6	162	24.8	88	10.3	18	7.0	106	9.5
Nursing	2	3.5	29	4.4	22	2.6	5	1.9	27	2.4
Pharmacy	2	3.5	22	3.4	41	4.8	3	1.2	44	4.0
Physical Education	1	1.8	22	3.4	61	7.2	5	1.9	66	5.9
Physical Therapy	1	1.8	5	0.8	22	2.6	0	0.0	22	2.0
Veterinary Medicine	7	12.3	79	12.1	40	4.7	21	8.2	61	5.5
Sum-Professional Col	57	100.0	652	100.0	853	100.0	257	100.0	1,110	100.0
Professional College	57	70.4	652	64.7	853	51.4	257	69.1	1,117	54.8
Arts & Science	24	29.6	355	35.3	806	48.6	115	30.9	921	45.2
TOTAL	81	100.0	1,007	100.0	1,659	100.0	372	100.0	2,038	100.0

College	Full time		Part time		Students* grad		Total		Research Revenue	
	#	%	#	%	#	%	#	%	000's $	%
Agriculture	511	7.2	35	6.1	180	22.6	726	8.6	10,145	37.6
Commerce	1,348	19.1	146	25.6	55	6.9	1,549	18.4	209	0.8
Dentistry	94	1.3	0	0.0	0	0.0	94	1.1	198	0.7
Education	2,140	30.3	283	49.6	136	17.1	2,559	30.4	139	0.5
Engineering	985	13.9	29	5.1	233	29.3	1,247	14.8	3,990	14.8
Law	308	4.4	2	0.4	12	1.5	322	3.8	25	0.1
Medicine	235	3.3	0	0.0	67	8.4	302	3.6	8,554	31.7
Nursing	333	4.7	38	6.7	13	1.6	389	4.6	157	0.6
Pharmacy	408	5.8	10	1.8	14	1.8	432	5.1	980	3.6
Physical Education	322	4.6	25	4.4	11	1.4	358	4.2	163	0.6
Physical Therapy	89	1.3	2	0.4	0	0.0	91	1.1	0	0.0
Veterinary Medicine	284	4.0	0	0.0	75	9.4	359	4.3	2,408	8.9
Sum Professional Colleges	7,057	100.0	570	100.0	796	100.0	8,428	100.0	26,968	100.0
Professional Colleges	7,057	56.1	570	42.1	796	65.2	8,428	55.6	26,968	77.9
Arts & Science	5,533	43.9	784	57.9	424	34.8	6,741	44.4	7,672	22.1
TOTAL	12,590	100.0	1,354	100.0	1,220	100.0	15,169	100.0	34,640	100.0

*Some not included - other colleges, part-time grad, non-credit because the subject areas they represent are covered by the full time programme.

Appendix 5: An Information Literacy Laboratory

Information literacy has been defined as "the ability to effectively access and evaluate information for a given need. It includes an integrated set of skills (research strategy and evaluation) and knowledge of tools and resources."[1] In universities it is traditionally the responsibility of faculty to teach these skills to their undergraduate and graduate students within the structure of a particular discipline. However, academic librarians have long considered it to be part of their responsibility to educate students in the general use of library resources. At the University of Saskatchewan, the Mission Statement of the Libraries sets out a two-fold purpose. One is the provision of information resources to the students and faculty of the University. The other is to educate this community in the use of information resources. Typically this second purpose has been accomplished through orientation and bibliographic instruction programs and in one-on-one sessions conducted informally when students approach reference librarians.

Two environmental factors are causing academic librarians to reevaluate how they carry out their teaching role. The first is the rise of the "information age" and the "information economy." The typical university graduate will work in an "information job" and almost certainly will make intensive use of information technology. Recent studies seem to show that today's students should expect to change careers several times throughout their lives and must therefore be prepared for "lifelong learning." Because access to information resources available through libraries or elsewhere will be a necessary component of this process at various stages of graduates' careers, academic librarians must try to teach students how to use those resources effectively. The second environmental change is the increasing pervasiveness of technology as both a method of generating information and also as a method of controlling and organizing information for use. Academic librarians are beginning to revise their orientation and bibliographic instruction programs to educate students to make the fullest use of the capacities of these technologies.

To fulfil this teaching purpose effectively a few academic libraries have established "hi tech" classrooms for bibliographic instruction. It is proposed that library staff design such a classroom facility for this campus and that funding be sought to construct and staff it.

In general, this classroom would look like the other microcomputer laboratories on campus. Library staff would also coordinate their activities in the area of instruction in the use of various automated bibliographic and information management applications with the User Support and Training Services unit of the Department of Computing Services.

Groups Served:
- Library staff
- Faculty
- Students

Purposes:
- Orientation and bibliographic instruction
- Experimentation with and testing of bibliographic and personal information management software

Individual instruction and training
Individual use by students and faculty during unbooked times as a public access microcomputer facility
Library staff training

Facilities:

Instructor's workstation, including screen projection equipment
Networked MS-DOS and Macintosh microcomputers
Library system workstations
Shared printing facilities
Communication links to remote databases
Scanners
Various software packages such as Pro-Cite, Reference Manager, AskSam, Zyindex, Library Master - these may be demonstration packages or site-licensed programs mounted on servers accessible to the laboratory

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